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Ocean Thermal Energy Conversion (OTEC) Development Under U.S. and International Law and Institutions

VED P. NANDA*

I. Introduction

The discussion in this paper is premised on three assumptions. First, the United States will need new technologies to meet its increasing energy demands by the end of the century. While the world energy demand is expected to double in a period of twenty to thirty years,[1] a recent study by the U.S. Department of Commerce indicates that the country's need for energy will grow 1.2% per person through the end of the century, and that the economy will grow by about 2.2% per year.[2] Second, this increasing demand for energy, deemed essential in order to maintain an acceptable level of economic activity, coupled with the oil crises of 1973-74 which gave rise to the demand for energy security in the United States, will necessitate the exploration of all reasonably promising energy alter-

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This article is an adapted version of a study, "Selected Legal and Institutional Issues Related to Ocean Thermal Energy Conversion (OTEC)," prepared by the author as a consultant to the Solar Energy Research Institute (SERI), Golden, Colorado. I am especially grateful to John Lawrence Hargrove, Director of Studies, American Society of International Law (ASIL), for sharing with me a recent study prepared by ASIL under an Energy Research and Development Administration (ERDA) contract and entitled, "International, Legal, Political and Institutional Aspects of OTEC Demonstration and Development," and to R. C. Tefft, President, Tefft, Kelly & Motley, Inc., for a study prepared by his firm entitled, "Toward a Legal, Institutional and Financial Framework for OTEC Demonstration and Commercialization." I have greatly benefited from these studies as well as from my discussions with Jan Laitos, George Morgan, and John Veigel of the Solar Energy Research Institute. However, I alone am responsible for the contents of the paper.

1. Cited in COUNCIL ON ENVIRONMENTAL QUALITY, SOLAR ENERGY—PROGRESS AND PROMISE 1 (1978).

2. Reported in Den. Post, Nov. 23, 1978, at 38, col. 1.

natives.[3] According to the National Energy Plan,[4] these principal alternative energy sources available to the United States—coal, nuclar power, and solar power (direct and indirect)—will be used in the years ahead. Finally, the steadily rising cost of fossil fuel, especially coal, the likely scarcity and increasing costs by the year 2000 of petroleum, natural gas, and U-235, and a growing concern over their detrimental environmental effects, will make these sources uneconomical for large scale electrical generation. Substitute sources will include OTEC, non-U-235 nuclear, and geothermal energy.

OTEC, an unconventional energy source and a unique energy technology, is an attractive alternative for several reasons. "[I]t can provide utilities with 'baseload capability' on line 24 hours a day. It can economically generate power at a level of 250 megawatts and up, enough for a moderate-sized city. Using a renewable resource, the sun, its 'fuel' is delivered directly to the site in usable form without charge. It is environmentally benign, emits no poisonous byproducts (barring the remote contingency of a massive leak of the working fluid—probably ammonia), and it is necessarily situated unobtrusively offshore, away from population centers. All evidence to date indicates that it has no harmful effect on ocean life; indeed, cold water upwellings are known to be beneficial to fish populations."[5]

Despite these attractive features, however, established utility companies have thus far shown little interest in pursuing technological studies and hardware demonstrations related to OTEC. This apparent lack of serious interest stems mainly from the perception that OTEC is an expensive, unproven, and risky undertaking. A combination of factors, including unproven economics (based on presently noncompetitive estimated costs of OTEC-generated energy), unverified social and environmental effects, and uncertainty as to the potential of energy from OTEC as well as how OTEC fits into the national energy policy is responsible for the prevailing skepticism. Also,

3. *See, e.g.*, Nye, Jr. *Nuclear Policy: Balancing Nonproliferation and Energy Security*, 78 DEP'T STATE BULL., Oct. 1978, at 39. *See also* 78 DEP'T STATE BULL., Sept. 1978, at 3.

4. Energy Policy and Planning, Executive Office of the President, THE NATIONAL ENERGY PLAN (U.S. Gov't Printing Off., April 1977).

5. Whitmore, *OTEC: Electricity from the Ocean*, 81 TECHNOLOGY REV., Oct. 1978, at 58-60.

the absence of an adequate legal and institutional framework further clouds the picture.

It seems that the uncertainty OTEC faces on technological and economic grounds will be dispelled by further studies and demonstration projects which are likely to be undertaken by the Department of Energy (DOE).[6] While the "engineering challenges to be bridged demand solutions of scale rather than of technical innovation,"[7] it is estimated that "the OTEC power plant should have an economic advantage over fossil fuel plants and nuclear plants well before the year 2000."[8]

However, these economic and technological issues will not be discussed here, nor will the financial aspects be investigated.[9] This study has as its primary focus those legal and institutional aspects which will ostensibly have a significant bearing upon the commercialization of OTEC. These issues are broadly classified as (1) jurisdictional, (2) regulatory, and (3) environmental. They will be discussed here in the context not only of existing international law—both customary and treaty law—but also of the current developments in the law and the probable changes in it, particularly those resulting from ongoing negotiations of the Third United Nations Conference on the

6. *Id.* at 58.

7. *Id.* at 61.

8. *Id.* at 63.

9. On technical, economic, and financial aspects, *see generally* H. KNIGHT, J. NYHART & R. STEIN, OCEAN THERMAL ENERGY CONVERSION (1977) [hereinafter cited as KNIGHT, NYHART & STEIN]; SCIENCE POLICY RESEARCH DIVISION, CONGRESSIONAL RESEARCH SERVICE, SUBCOMM. ON ADVANCED ENERGY TECHNOLOGIES AND ENERGY CONSERVATION RESEARCH, DEVELOPMENT AND DEMONSTRATION OF THE HOUSE COMM. ON SCIENCE AND TECHNOLOGY, 95TH CONG. 2D SESS., ENERGY FROM THE OCEAN 25-79 (Comm. Print 1978); E. FRANCIS, INVESTMENT IN COMMERCIAL DEVELOPMENT OF OCEAN THERMAL ENERGY CONVERSION (OTEC) PLANT-SHIPS (1977) (Prepared by Johns Hopkins University Applied Physics Laboratory for U.S. Dep't of Commerce); SOLAR ENERGY RESEARCH INSTITUTE, ECONOMIC FEASIBILITY AND MARKET READINESS OF EIGHT SOLAR TECHNOLOGIES: INTERIM DRAFT REPORT 130-45 (1978) (Prepared for U.S. Dep't of Energy) [hereinafter cited as SERI INTERIM DRAFT REP.]; R. TEFFT, R. KELLY, C. DICK, JR., & K. STEVENSON, TOWARD A LEGAL, INSTITUTIONAL AND FINANCIAL FRAMEWORK FOR OTEC DEMONSTRATION AND COMMERCIALIZATION (1978) (Prepared for ERDA by Tefft, Kelly and Motley, Inc.) [hereinafter cited as TEFFT, KELLY & MOTLEY, INC. STUDY]; B. WASHOM & J. NILLES, INCENTIVES FOR THE COMMERCIALIZATION OF OCEAN THERMAL ENERGY CONVERSION TECHNOLOGY (OTEC) (1977) (Prepared for RANN, Nat'l Sci. Found.); J. WITWER, J. ALICH, S. KOHAN, M. LEVINE, P. MEAGHER, E. PICKERING, F. SCHOOLEY, A. SLEMMONS, & T. THOMPSON, 1 A COMPARATIVE EVALUATION OF SOLAR ALTERNATIVES: IMPLICATIONS FOR FEDERAL RD&D 95-101 (1978) (Submitted to Solar Working Group, U.S. Dep't of Energy); and 5 SHARING THE SUN: SOLAR TECHNOLOGY IN THE SEVENTIES 392-548 (K. Böer ed. 1976).

Law of the Sea (LOS III).[10] Several alternatives will be discussed and recommendations offered in each area in light of the United States' interests.

This discussion will be prefaced by a short assessment of the possible arrangements for the siting of OTEC plants, their functions, and their potential for the United States.[11] The most likely configurations for OTEC plants will be: (1) an OTEC facility operating individually as a semipermanent fixture, or a number of plants moored in clusters of eight to ten plants around a central collection device, and connected to shore by a transmission cable, supplying electrical power for general consumption to a land-based electricity grid; or (2) an open sea OTEC facility, a plant-ship, migrating and "grazing" on the surface, seeking the maximum thermal differential gradient and supplying power for an energy-intensive industry at sea. Such a facility could, for example, produce onsite ammonia to be used for the production of fertilizers and industrial chemicals or as a hydrogen carrier for production of electricity, or aluminum, or engage in energy-intensive commodity processing such as manganese nodules. The energy produced then could be converted into other forms of energy, such as hydrogen, and the products produced onsite transported to shore by vessel. Such products could also be manufactured and processed in such places as Hawaii and Puerto Rico, which are close to some of the prospective sites of OTEC facilities.

Because of the thermal gradient needed to make OTEC operative, tropical regions within 10° of the equator, comprising about twenty million square miles, where the surface water is around 80°F., while the cold water 3,000 feet below is around

10. The Conference which began in Caracas in 1974 concluded its resumed seventh session on September 15, 1978 and will convene its eighth session in Geneva on March 19, 1979. For a short report on the latest session, see 15 UN CHRONICLE, Aug.-Sept. 1978, at 41-42. Voluminous legal literature has grown around the Conference issues. *See, e.g.*, various publications of the Law of the Sea Institute including the papers and proceedings of its annual conferences, and its occasional and special papers; 1-6 NEW DIRECTIONS IN THE LAW OF THE SEA (R. Churchill, M. Nordquist, S. Lay, K. Simmonds & J. Welch eds. 1973-77); R. DUPUY, THE LAW OF THE SEA: CURRENT PROBLEMS (1974); S. ODA, THE LAW OF THE SEA IN OUR TIME (1977); THE LAW OF THE SEA: ISSUES IN OCEAN RESOURCE MANAGEMENT (D. Walsh ed. 1977); Symposia in volumes 6-15 of SAN DIEGO L. REV., 6 *id.* at 339-513 (1969); 7 *id.* at 371-673 (1970); 8 *id.* at 453-747 (1971); 9 *id.* at 383-751 (1972); 10 *id.* at 425-691 (1973); 11 *id.* at 535-838 (1974); 12 *id.* at 491-742 (1975); 13 *id.* at 483-778 (1976); 14 *id.* at 507-750 (1977); 15 *id.* at 357-662 (1978).

11. The assessment is based on a study of sources cited in note 9 *supra*.

40° F., offer the most promising sites for OTEC facilities which fit into configuration one discussed above. For the United States, however, these sites are limited to the Gulf Coast, Hawaii, Puerto Rico, and the Pacific territories. According to the studies of the Energy Research and Development Administration (ERDA), a thermal resource of at least 300,000 megawatts lies just off the west coast of Florida.[12] It is anticipated that the technological developments expected from DOE's current OTEC Research, Development and Demonstration (RD&D) Program would allow the exploitation of this resource. Other sudies indicate that the off-grid applications mentioned in configuration two type facilities will have a market potential of an average of 30,000 to 40,000 megawatts during the years 2000 to 2025.[13]

II. JURISDICTIONAL, REGULATORY, AND ENVIRONMENTAL ISSUES

Regardless of the site of an OTEC facility, or its system and configuration, ownership, operation, energy potential and use, the move toward OTEC commercialization will be facilitated if the prevalent uncertainties regarding the issues to be discussed in this section are removed and an adequate legal and institutional framework is established, offering guidelines to interested parties. The following discussion, which is designed to present a broad outline of such a framework, surveys the current state of the law, suggests likely changes, identifies existing ambiguities, gaps and uncertainties, and makes recommendations to remove them.

A. *Jurisdictional Issues*

In the United States offshore areas, questions of jurisdiction, that is, questions pertaining to the competence to prescribe and apply the governing law to peoples, events, and activities in these areas, arise in two contexts: national-international and Federal-State. In the former, activities are governed by norms established by multilateral treaties, regional and bilateral arrangements, and customary law, supplemented by unilateral action; in the latter, by statutory law and judicial pronouncements.

1. *National-International Issues*

The unsettled state of the Law of the Sea is responsible for the presence of unresolved jurisdictional issues pertaining to

12. Cited in TEFFT, KELLY & MOTLEY, INC. STUDY, *supra* note 9, at 3.
13. Cited in *id.*

the installations of OTEC devices in offshore areas. The law is still in an evolutionary state and LOS III, which adjourned its resumed seventh session in New York on September 15, 1978 and will convene its next session in Geneva on March 19, 1979,[14] is attempting to formalize a comprehensive and generally acceptable convention dealing with all aspects of ocean space. While differences on some key issues, such as the mining of the deep seabed, still remain unresolved, the negotiations have shown a remarkable consensus on most issues likely to affect OTEC deployment and operation. Also, regional and bilateral arrangements and unilateral state practices and claims are instrumental in changing the traditional Law of the Sea.

The basic issue pertinent to the present discussion is a coastal state's rights in adjacent waters and on the high seas. Under traditional international law, the inquiry has centered on the limit of territorial waters, and additionally, since the 1958 Geneva Conventions on the Law of the Sea,[15] on the extent of contiguous zones and the outer limit of the continental shelf. Beyond these areas, the universally applicable concept has been freedom of the high seas.

a. *OTEC Devices Under Traditional International Law Regarding the Territorial Sea*

Historically, coastal nation states have enjoyed certain exclusive rights and privileges with respect to adjacent waters over a narrow belt of three marine miles along their coasts, measured from the low water mark, which constituted their territorial waters.[16] These rights are similar to those they exer-

14. 15 UN CHRONICLE, Aug.-Sept. 1978, at 41-42.

15. The following four conventions were concluded at the 1958 Law of the Sea Conference in Geneva: Convention on the Continental Shelf, *done* at Geneva, April 29, 1958, 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 312 (effective June 10, 1964) [hereinafter cited as the Continental Shelf Convention]; Convention on Fishing and Conservation of the Living Resources of the High Seas, *done* at Geneva, April 29, 1958, 17 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285 (effective March 20, 1966) [hereinafter cited as the Fishery Convention]; Convention on the High Seas, *done* at Geneva, April 29, 1958, 13 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82 (effective Sept. 30, 1962) [hereinafter cited as the High Seas Convention]; Convention on the Territorial Sea and the Contiguous Zone, *done* at Geneva, April 29, 1958, 15 U.S.T. 1606, T.I.A.S. No. 5639, 516 U.N.T.S. 205 (effective Sept. 10, 1964) [hereinafter cited as the Territorial Sea Convention].

16. *See generally* arts. 1-13 of the Territorial Sea Convention; M. MCDOUGAL & W. BURKE, THE PUBLIC ORDER OF THE OCEANS 174-304, 446-564 (1962) [hereinafter cited as MCDOUGAL & BURKE]; Baty, *The Three-Mile Limit*, 22 AM. J. INT'L L. 503 (1928); Kent, *The Historical Origins of the Three-Mile Limit*, 48 AM. J. INT'L L. 537 (1954).

cise over their internal waters and over their land masses, and were subject only to innocent passage of foreign vessels through these waters.[17] During the last fifty years, however, the breadth of territorial waters has been marked by a lack of uniformity. While the international conferences in 1930,[18] 1958,[19] and 1960,[20] failed to reach agreement on the limits of the territorial sea, the 1958 conference did adopt a proposal which could be read to measure the breadth of the territorial seas restrictively rather than defining it in affirmative terms. Article 24(1) of the 1958 Convention on the Territorial Sea and the Contiguous Zone[21] provides a coastal state limited jurisdiction over the high seas contiguous to its territorial sea. This zone "may not extend beyond twelve miles from the baseline from which the breadth of the sea is measured."[22]

Article 24 did not guarantee coastal states the same specified rights in the contiguous zones as they enjoy in their territorial waters;[23] however, it impliedly limited the coastal state's right to exercise those essential rights beyond the twelve-mile limit. The Convention thus precluded a coastal state from claiming territorial waters beyond twelve miles.

Under traditional international law, therefore, an OTEC device deployed for research[24] or commercial purposes within

17. Arts. 14-23 of the Territorial Sea Convention.

18. *See* Conference for the Codification of International Law, *Bases of Discussion*, League of Nations Publication C. 74. M. 39. 1929. V.

19. *See* United Nations Conference on the Law of the Sea, Official Records (7 Vols.), U.N. Doc. A/CONF. 13 (1958).

20. *See* Second United Nations Conference on the Law of the Sea, *Summary Records of Plenary Meetings and of the Meetings of the Committee of the Whole, Annexes and Final Act*, U.N. Doc. A/CONF. 19/8 (1960). Extensive literature exists on the 1958 and 1960 Law of the Sea Conferences. For a most comprehensive and thorough study of the various issues discussed in the conferences, see MCDOUGAL & BURKE. *See also* C. COLOMBOS, THE INTERNATIONAL LAW OF THE SEA (6th ed. 1967) [hereinafter cited as COLOMBOS]; D. BOWETT, THE LAW OF THE SEA (1967); Dean, *The Geneva Conference on the Law of the Sea: What Was Accomplished*, 52 AM. J. INT'L L. 607 (1958); Dean, *The Second Geneva Conference on the Law of the Sea: The Fight for Freedom of the Seas*, 54 *id.* at 751 (1960); Fitzmaurice, *Some Results of the Geneva Conference on the Law of the Sea*, 8 INT'L & COMP. L. Q. 73 (1959); Nanda, *Some Legal Questions on the Peaceful Uses of Ocean Space*, 9 VA. J. INT'L L. 343 (1969).

21. *See* note 15 *supra*.

22. Art. 24(2) of the Territorial Sea Convention.

23. This is in view of the distinction drawn between art. 24(1)(a) and 24(1)(b) of the Convention pertaining to a coastal state's right to take preventive or punitive measures by the infringement of its domestic regulations.

24. Historically, there has been no freedom of scientific research within the territorial sea. On marine scientific research *see generally* W. BURKE, SCIENTIFIC RESEARCH

the territorial limits would be within the exclusive competence of the coastal state, since the term "sovereignty" has been continuously used to describe a coastal state's rights in territorial waters.[25]

b. *OTEC Devices Under the Emerging Law on the Territorial Sea*

Although the 1958 convention failed to set a definite limit on the breadth of the territorial waters, state practices were fast eroding the traditional three-mile limit. A United Nations Secretariat study in 1968 revealed that fewer than one-third of the states reporting (30 of 92) had opted for less than six miles while nearly half (43 of 92) opted for twelve miles or more, and only a small number (9) were claiming more than twelve miles.[26]

The current product of the LOS III negotiations is the Informal Composite Negotiating Text (ICNT), a massive document containing 303 articles and 7 annexes,[27] which sets the breadth of the territorial sea at twelve miles,[28] and that of continguous zones for similarly specified purposes as were contained in the 1958 convention at twenty-four miles.[29] Within this adjacent maritime belt, a coastal state's sovereignty is recognized as extending to the air space over the territorial sea as well as to the seabed and subsoil,[30] and is limited only by the right of innocent passage.[31]

Although ICNT is to "serve purely as a procedural device and [to] only provide a basis for negotiation without affecting the right of any delegation to suggest revisions in the search for

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ARTICLES IN THE LAW OF THE SEA INFORMAL SINGLE NEGOTIATING TEXT (Occasional Paper no. 25, Law of the Sea Institute, University of Rhode Island, June 1975); FREEDOM OF OCEANIC RESEARCH (W. Wooster ed. 1973); Winner, *Science, Sovereignty, and the Third Law of the Sea Conference*, 4 OCEAN DEV. & INT'L L. 297 (1977); Wooster, *Some Implications of Ocean Research*, 1 *id.* at 13 (1974).

25. Arts. 1 and 2 of the Territorial Sea Convention.

26. *See* Document prepared by U.N. Secretariat, *Survey of National Legislation Concerning the Sea-bed and the Ocean Floor, and the Subsoil thereof, Underlying the High Seas Beyond the Limits of Present National Jurisdiction*, U.N. Doc. A/AC.135/11 and A/AC.135/11/Add. 1 (1968).

27. U.N. Third Conference on the Law of the Sea, *Informal Composite Negotiating Text from the Sixth Session*, U.N. Doc. A/CONF. 62/WP. 10 & Corr. 1-3 (1977) [hereinafter cited as ICNT].

28. *Id.* art. 3.

29. *Id.* art. 33.

30. *Id.* art. 2.

31. *Id.* arts. 17-32.

a consensus,"[32] there is an almost universal consensus on the twelve-mile limit for the territorial seas. Within this zone, the coastal state will have almost total control over the installation and operation of an OTEC facility, both for research and commercial use.

c. *OTEC Devices on the Exclusive Economic Zone and the Continental Shelf*

(i) *Exclusive Economic Zone*[33]

Beyond the twelve-mile territorial sea and the twenty-four-mile contiguous zone, ICNT recognizes a special area known as the Exclusive Economic Zone (EEZ) which extends seaward to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.[34] This zone has a special relevance for OTEC siting, because ICNT grants the coastal state

> sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the sea-bed and subsoil and the superjacent waters, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds.[35]

Additionally, the coastal state's jurisdiction extends within EEZ to "(i) the establishment and use of artificial islands, installations and structures; (ii) marine scientific research; (iii) the preservation of the marine environment."[36] Other states enjoy some of the traditional freedoms of the high seas in EEZ—freedom "of navigation and overflight and of the laying of submarine cables and pipelines,"[37] but not fishing, scientific

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32. U.N. Third Conference on the Law of the Sea, *Informal Composite Negotiating Text—Explanatory Memorandum by the President*, U.N. Doc. A/CONF. 62/WP. 10/Add. 1 (1977), *reprinted* in 16 INT'L LEGAL MATERIALS 1099, 1100 (1977).

33. *See generally* D. JOHNSTON & E. GOLD, THE ECONOMIC ZONE IN THE LAW OF THE SEA: SURVEY, ANALYSIS AND APPRAISAL OF CURRENT TRENDS (Occasional Paper No. 17, Law of the Sea Institute, University of Rhode Island, June 1973); Alexander & Hodgson, *The Impact of the 200-Mile Economic Zone on the Law of the Sea*, 12 SAN DIEGO L. REV. 569 (1975); Kronfol, *The Exclusive Economic Zone: A Critique of Contemporary Law of the Sea*, 9 J. MAR. L. & COMM. 461 (1978); Hollick, *The Origins of the 200-Mile Offshore Zones*, 71 AM. J. INT'L L. 494 (1977); Phillips, *Exclusive Economic Zone as a Concept in International Law*, 26 INT'L & COMP. L. Q. 585 (1977).

34. ICNT, art. 57.

35. *Id.* art. 56(1)(a).

36. *Id.* art. 56(b).

37. *Id.* art. 58(1).

research, nor pollution control, which are now under the exclusive jurisdiction of coastal states.

The establishment of EEZ is perhaps the most significant development in the Law of the Sea since President Truman's Proclamation on the Continental Shelf in 1945,[38] which claimed for the United States the natural resources of the seabed and the subsoil of its continental shelf lying beyond the traditional three-mile limit. A variety of claims for exclusive jurisdiction by coastal states over the high seas area beyond their territorial seas followed the Truman proclamation, the most notable initially being claims by several Latin American countries to a 200-mile territorial sea[39] and more recently by Canada to a 100-mile pollution control zone.[40]

Subsequently, when LOS III began its deliberations, two proposals formed the basis of what has finally emerged as EEZ—one, a 200-mile economic zone, proposed by a majority of African states,[41] and the other, an exclusive "Patrimonial Sea" with an outer limit of 200 miles and similar jurisdiction over the natural resources up to the edge of the continental margin, adopted at the 1972 Santo Domingo Conference by a group of Caribbean countries.[42] Although these zones were orig-

38. Pres. Proc. No. 2267, 3 C.F.R. 67 (1943-48 Compilation). *See generally* Hollick, *U.S. Oceans Policy: The Truman Proclamations*, 17 VA. J. INT'L L. 23 (1977).

39. *See* Agreement between Chile, Peru, and Ecuador, August 18, 1952, Declaration on the Maritime Zone, art. 3 (II), U.N. Legislative Series, *Laws and Regulations of the Regime of the Territorial Sea* 723-27 (1957). *See generally* B. MACCHESNEY, SITUATION, DOCUMENTS AND COMMENTARY ON RECENT DEVELOPMENTS IN THE INTERNATIONAL LAW OF THE SEA, 1956, at 264-94, 448, 455-56, 486-87 (1957); B. AUGUST, THE CONTINENTAL SHELF: THE PRACTICE AND POLICY OF THE LATIN AMERICAN STATES WITH SPECIAL REFERENCE TO CHILE, ECUADOR AND PERU 187-203 (1960); F. GARCIA AMADOR, LATIN AMERICA AND THE LAW OF THE SEA (Occasional Ppaer No. 14, Law of the Sea Institute, University of Rhode Island, July 1972). In 1966, Argentina extended its territorial sea by a decree (Law No. 17, 094-M. 24, Buenos Aires, 29 December 1966) promulgating that "the sovereignty of the Argentine nation shall extend over the sea adjacent to its territory for a distance of 200 nautical miles measured from the line of the lowest tide." U.N. General Assembly, Ad Hoc Committee to study the peaceful uses of the sea-bed and the ocean floor beyond the limits of national jurisdiction, 2d Sess., *Survey of National Legislation Concerning the Sea-bed and the Ocean Floor, and the Subsoil thereof, Underlying the High Seas Beyond the Limits of Present National Jurisdiction* 7-8, U.N. Doc. A/AC.135/11 (1968).

40. *See* Arctic Waters Pollution Prevention Act of 1970, CAN. REV. STAT. c. 2, at 3-25 (1st Supp. 1970).

41. *Organization of African Unity: Declaration on the Issues of the Law of the Sea*, U.N. Doc. A/AC.138/86 (1972). *See also* U.N. Docs. A/AC.138/79 (1972); A/CONF. 62/33 (1974).

42. The 1972 Declaration of Santo Domingo is contained in U.N. Doc. A/AC.138/80 (1972).

inally conceived as essentially resource-control zones, the coastal states' powers are greatly enhanced by the grant of "exclusive jurisdiction" to them regarding exploration and exploitation, pollution control, and scientific research.

Although ICNT does not specifically mention coastal states' jurisdiction over OTEC activities within EEZ, it would be a valid conclusion that coastal states will have exclusive competence over the deployment and regulation of OTEC installations within their EEZ for research purposes or commercial operations. Any reasonable interpretation of ICNT provisions will support this conclusion. To illustrate, article 56(a) grants a coastal state "sovereign rights" within EEZ for "other activities for the economic exploitation and exploration of the zone, such as the production of energy from water, currents and winds." This would obviously include the energy produced by an OTEC operation. Article 60 explicitly provides for a coastal state's "exclusive right to construct and to authorize and regulate the construction, operation and use of: (a) Artificial islands; (b) Installations and structures for the purposes provided for in article 56 and other economic purposes; (c) Installations and structures which may interfere with the exercise of the rights of the coastal State in the zone." Article 247(2) provides that "[m]arine scientific research activities in the exclusive economic zone and on the continental shelf shall be conducted with the consent of the coastal State." Moreover, there is such an overwhelming consensus among the participants at LOS III on EEZ that even if the efforts to formalize a comprehensive treaty on the Law of the Sea were to fail, EEZ will in the near future be accorded legitimacy by state practices, transforming it into a rule of customary international law.

It appears that the coastal state's permission would be required to install an OTEC device in its EEZ either for research purposes or commercial operation. Until now, no nation state has adopted specific legislation addressing this issue. However, once OTEC technology and economics are proven, such legislative measures prescribing conditions for access to EEZ and outlining the legal and institutional arrangements under which a foreign entity is permitted to operate an OTEC facility within that zone will, in all probability, be adopted by countries wishing to attract a foreign owned/operated OTEC facility within its EEZ. Bilateral and regional arrangements

regarding the deployment and operation of an OTEC device within a coastal state's EEZ would be another way of establishing conditions for the installation of OTEC devices.

(ii) *Continental Shelf*

Under the 1958 Geneva Convention on the Continental Shelf,[43] "sovereign rights" of the coastal states in the continental shelf (defined as beginning at the seaward limit of the territorial sea and continuing to the 200-meter isobath),[44] are restricted to "exploring it and exploiting its natural resources,"[45] leaving unaffected the "legal status of the superjacent waters as high seas, or that of the airspace above those waters."[46] A coastal state's consent is imperative for any scientific research concerning the continental shelf and conducted there.[47]

Thus, although theoretically an OTEC device of another nation could be moored on a coastal state's continental shelf, while the device itself is located on the high seas, provided it did not interfere with the coastal state's exclusive right to exploit natural resources in that area,[48] the prospects that this would happen are unlikely without the consent of the coastal state. A coastal state's special rights in adjacent waters with regard to scientific research and pollution control are widely accepted, and with the emergence of EEZ, such a possibility without the coastal state's consent could be ruled out.

ICNT modifies the definition of the continental shelf by providing that it extends to the outer edge of the continental margin or to a distance of 200 miles when the outer edge of the continental margin does not extend that far.[49] While other ICNT provisions[50] do not substantially change the prior law,

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43. *See* note 15 *supra*.

44. Art 1 of the Continental Shelf Convention. The Convention left the legal definition of the continental shelf, a compromise formula, open-ended — up to a depth of 200 meters, or a technologically exploitable distance.

45. *Id.* art. 2.

46. *Id.* art. 3.

47. *Id.* art. 5(8). Although it adds that the coastal state "shall not normally withhold its consent" if a qualified institution makes a request, it grants the coastal state the right "if it so desires, to participate or to be represented in the research, and that in any event the results shall be published."

48. Based on arts. 4-5 of the Continental Shelf Convention, Knight makes this argument in Knight, *International Jurisdictional Issues Involving OTEC Installations*, in KNIGHT, NYHART & STEIN *supra* note 9, at 45-73.

49. ICNT, art. 76.

50. *Id.* arts. 77-85.

articles pertinent to OTEC siting should be noted.

Article 80 on "Artificial Islands, Installations and Structures on the Continental Shelf," provides that article 60, which grants the exclusive right to the coastal state to construct, authorize, and regulate construction, operation and use of such artificial islands, installations and structures, applies *mutatis mutandis*. Similarly, Article 247 adopts the consent regime for scientific research on the continental shelf, although some of the obstacles for conducting research in the waters above the continental shelf have been ameliorated.[51]

The conclusion is inescapable that a coastal state will have exclusive competence over the installation of any OTEC device located over its continental shelf for research or commercial purposes.

d. *OTEC Devices on the High Seas*

(i) *Traditional Law*

Under the freedom of the seas concept, every nation has unrestricted access to the high seas, but none is permitted any long term appropriation of any part of the high seas for its exclusive use.[52] This principle was recently reaffirmed by the U.S. Supreme Court.[53] The practical reasons for the universal acceptance of this principle lie in (1) the increasing use of the ocean as an international highway for commerce during the post-Industrial Revolution era, which coincided with the period of Western colonialism in the 18th and 19th centuries, and (2) the lack of effective occupation of large areas of ocean claimed by major powers.[54]

In 1958, the Geneva Convention on the High Seas codified the essence of the freedom of the seas by providing

> both for coastal and non-coastal states:
>
> 1. Freedom of navigation;
> 2. Freedom of fishing;
> 3. Freedom to lay submarine cables and pipelines;
> 4. Freedom to fly over the high seas.

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51. *See, e.g., id.* arts. 243-53.

52. Cited in COLOMBOS at 51.

53. U.S. v. Louisiana, 363 U.S. 1, 33-34 (1959) [Footnotes in the opinion omitted].

54. See COLOMBOS at 60-61.

> These freedoms and others which are recognized by the general principles of international law shall be exercised by all states with reasonable regard to the interests of other states in their exercise of the freedom of the high seas.[55]

Obviously, these freedoms—commercial navigation, military uses, fishing, laying of submarine cables and pipelines—give rise to conflicting uses of the high seas. For the management of these conflicting uses, the standard is that of reasonableness with regard to the interests of other users, that is, not unreasonably interfering with their uses. The deployment of an OTEC device for research or commercial purposes could be justified under this "reasonable use" concept. The recent U.S. legislation authorizing the construction of deep water ports beyond the limits of its territorial sea,[56] which was justified on this reasonable use theory,[57] offers an appropriate precedent. Since states traditionally have the primary responsibility for regulating the activities of vessels flying their flags on the high seas, applying that analogy to OTEC devices, any OTEC installation owned or authorized by a state on the high seas would be under its authority and control. Similarly, under the laws of nationality, nationals are always and everywhere subject to the laws of their nation state[58] and their activities on an OTEC device on the high seas would be governed by the laws of the state of their nationality.

(ii) *LOS III and the Deep Seabed*

Current negotiations in LOS III are still stymied on the nature and scope of the proposed regime for deep seabed mining.[59] Nevertheless, pertinent ICNT provisions which have a

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55. Art. 2 of the High Seas Convention. *See* note 15 *supra.*

56. The Deepwater Port Act of 1974, 33 U.S.C. §§ 1501-24 (1976) [hereinafter cited as DPA]. For legislative history and purpose see [1974] U.S. Code Cong. and Ad. News 7529. *See generally* Krueger, Nordquist, & Wessely, *New Technology and International Law: The Case of Deepwater Ports,* 17 VA. J. INT'L L. 597 (1977); Comment, *Territorial Status of Deepwater Ports,* 15 SAN DIEGO L. REV. 603 (1978); Note, *The Regulation of Deepwater Ports,* 15 VA. J. INT'L L. 927 (1975).

57. *See Hearings on S.1751 and S.2232 before the Special Joint Subcomm. on Deepwater Ports Legislation of The Senate Comm. on Commerce, Interior and Insular Affairs, and Public Works,* 93d Cong., 1st Sess., pt. 1, 606-19 (1973)(Statement of John Norton Moore).

58. *See generally* H. VAN PANHUYS, THE ROLE OF NATIONALITY IN INTERNATIONAL LAW (1959); Brownlie, *Relations of Nationality in Public International Law,* 39 BRIT. Y.B. INT'L L. 284 (1963); McDougal, Lasswell & Chen, *Nationality and Human Rights: The Protection of the Individual in External Arenas,* 83 YALE L. J. 900 (1974).

59. For a recent commentary, see LaQue, *Different Approaches to International Regulation of Exploitation of Deep-Ocean Ferromanganese Nodules,* 15 SAN DIEGO L.

bearing on the deployment and operation of an OTEC facility will be considered here. This discussion will be prefaced by noting the United Nations General Assembly Resolution 2749 of December 17, 1970,[60] which declared, among other things, that

> 1. The sea-bed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction (hereinafter referred to as the area), as well as the resources of the area, are the common heritage of mankind.
> 2. The area shall not be subject to appropriation by any means by States or persons, natural or juridical, and no State shall claim or exercise sovereignty or sovereign rights over any part thereof.

ICNT attempts to give concrete shape to the "common heritage" concept. It declares the area constituting "the sea-bed and ocean floor and subsoil thereof beyond the limits of national jurisdiction"[61] (Area), and its resources to be "the common heritage of mankind,"[62] and envisages the establishment of an International Sea-Bed Authority (ISA) to organize and control activities in the Area. No state is to claim or exercise sovereignty there and no exclusive appropriation is permissible.[63] The legal status of the waters superjacent to the Area or that of the airspace above those waters are left unaffected.[64] While activities in the Area are defined as "all activities of exploration for, and exploitation of, the resources of the Area,"[65] in subsequent provisions,[66] activities are construed broadly as covering, among other subjects, those of marine scientific research, transfer of technology, and protection of the marine environment and human life. However, again in Article 150, activities are construed narrowly, referring only to exploration and exploitation of resources. Thus, there is considerable ambiguity regarding ISA's control in the Area.

REV. 477 (1978). *See also* Charney, *The International Regime for the Deep Seabed: Past Conflicts and Proposals for Progress*, 17 HARV. INT'L L. J. 1 (1976); Note, *A New Combination to Davy Jones' Locker: Melee over Marine Minerals*, 9 LOY. CHI. L. J. 935 (1978).

60. G.A.Res. 2749, 25 U.N. GAOR, Supp. (No. 28) 24, U.N. Doc. A/8028 (1970) (adopted by a vote of 108 to 0, with 14 abstentions: the United States voted for its adoption).

61. ICNT, art. 1(1).

62. *Id.* art. 136.

63. *Id.* art. 137(1).

64. *Id.* art. 135.

65. *Id.* arts. 1(3), 133(a).

66. *Id.* arts. 143-49.

Resources are defined as "mineral resources *in situ*,"[67] which are subject to ISA's licensing and regulation.[68] Minerals include "water, steam, hot water."[69] While it can be argued that ISA's jurisdiction extends to "fresh water aquifers and similiar *sub-surface* water sources, not the cold water lying near the seabed that might be used by an OTEC device,"[70] a broad interpretation by ISA of these provisions is quite possible, under which OTEC deployment for scientific research or commercial purposes could be covered.[71] Also, despite the current provision, under which ISA has no jurisdiction over the superjacent waters of the high seas,[72] it is probable that its jurisdiction in the near future will extend to activities in the water column and on the surface,[73] thereby affecting OTEC operations. Such an outcome would be consistent with the growing demands of the developing states for a strong ISA which could give meaning to "the common heritage" concept. Similarly, the mooring of an OTEC device on the high seas, which would require corings and other physical investigations of the ocean floor and the seabed, could be perceived as an economic use of the Area, and therefore subject to ISA's jurisdiction. Additionally, ISA could assume jurisdiction, should such mooring pose any actual or potential interference to seabed mining activities which are to be regulated by ISA. Of

67. *Id.* art. 133(b).

68. *Id.* Annex II.

69. *Id.* art. 133(c)(i).

70. Knight, *OTEC and the Law of the Sea: The Jurisdictional Problems*, in AMERICAN SOCIETY OF INTERNATIONAL LAW, INTERNATIONAL, LEGAL, POLITICAL AND INSTITUTIONAL ASPECTS OF OTEC DEMONSTRATION AND DEVELOPMENT 15 (Study prepared for ERDA, Sept. 1978) [hereinafter cited as ASIL STUDY].

71. Knight acknowledges this possiblity: "It is therefore not only conceivable but likely that if sufficient information were presented in international fora to indicate that OTEC and similar energy-producing devices might be substantial sources of economic wealth or political leverage, underdeveloped countries would move either in LOS-3 or in another forum to seek a regulatory regime governing such activities beyond the exclusive economic zones of coastal states." *Id.* at 15.

72. ICNT, art. 135.

73. *See, e.g.*, The Maltese Draft, a working paper introduced by the Delegation of Malta in the United Nations Seabed Committee in 1971, *Draft Ocean Space Treaty — Working Paper Submitted by Malta*, in REPORT OF THE COMMITTEE ON THE PEACEFUL USES OF THE SEA-BED AND THE OCEAN FLOOR BEYOND THE LIMITS OF NATIONAL JURISDICTION, 26 U.N. GAOR, Supp. (No. 21) 105, U.N. Doc. A/8421 (1971), which treats "international ocean space," the area beyond clearly defined limits of national jurisdiction, as a *unitary concept, encompassing seabed, water column, and surface, the whole constituting the "common heritage of mankind." Id.* pt. IV (emphasis added).

course, ISA could assert jurisdiction over marine scientific research in the Area which is to be carried out "exclusively for peaceful purposes and for the benefit of mankind as a whole."[74]

Consequently, it appears that under the envisaged seabed regime, OTEC activities on the high seas could be subjected to the jurisdiction of the proposed ISA. Perhaps two exceptions to ISA jurisdiction are possible: (1) A coastal state might extend its competence to an OTEC facility which lies beyond its EEZ, but which poses an actual or potential threat to its living and nonliving resources by adversely affecting the marine environment, or (2) if there is no accord at LOS III on a deep seabed regime and the existing law applies under which the deployment of an OTEC facility on the high seas could be justified under the "reasonable use" concept.

e. *Recommendations*

The major United States objectives which determine its policy on national-international jurisdictional issues include freedom of navigation and the establishment of an equitable regime for deep seabed mining. Since energy sources in the oceans including OTEC are of considerable significance to the United States, U.S. negotiators at LOS III should pay close attention to the implications of the emerging treaty on OTEC siting and deployment in adjacent coastal waters as well as on the high seas. The primary questions for consideration would be: (1) Is it in the United States' interest to seek freedom of OTEC siting and deployment in the emerging twelve-mile territorial seas and EEZ? (2) What kind of regime regarding OTEC activities on the high seas should the United States seek? (3) If efforts to finalize a comprehensive treaty on the Law of the Sea fail, what kind of claims would be in the United States' interest to assert?

Apparently, ICNT provisions regarding the extension of coastal states' boundaries to a twelve-mile territorial zone and a 200-mile EEZ are acceptable to the United States. Consequently, there are two policy options open to the United States regarding these zones. One is to accept the coastal state's exclusive competence in the region, which will exclude any U.S. OTEC siting in foreign waters within these zones and without

74. ICNT, art. 143(1).

the coastal state's consent; and the other is to seek freedom of OTEC activities within these zones.

There does not seem to be any chance of reversing the widely accepted policy of exclusive coastal state competence in the territorial waters, even if the U.S. were to vigorously seek an exception for OTEC activities. Similarly, despite some ambiguities regarding EEZ,[75] no exceptions in favor of OTEC activities in this zone are likely to be accepted by a majority of nations at the current LOS III negotiations. The United States could, perhaps, still seek such an exception if it were found to be in its interest and could make appropriate reservations to the finalized treaty. However, in light of the recent developments regarding a coastal state's assertion of its competence in coastal waters, especially pertaining to marine pollution and natural resources, it is unlikely that such a United States assertion would be recognized by other states. Thus, it is recommended that the United States accept the 200-mile coastal state competence regarding OTEC siting and deployment. This course of action would appear to be beneficial to the United States as well, since the U.S. has a major OTEC source lying off the west coast of Florida within its 200-mile zone. The recent United States extension of its fishery zone[76] and the establishment of zones to enforce navigational safety rules[77] and to control pollution[78] indicate that there would be a strong demand in the U.S. Congress to assert such control. It is recommended that as a first desirable step, Congress enact legislation creating a Coastal Energy Conservation and Management Zone extending to a 200-mile limit. Under this proposed legislation, the United States will claim jurisdiction for the specific purpose suggested by the title—energy conservation and management. The proposed legislation will be an interim measure, seeking limited jurisdiction patterned after the DPA[79] model. The proposed Act will be superseded by the legislation required to implement the EEZ provisions of the Law of the Sea Treaty when it is concluded.

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75. *See* notes 65-67 *supra* and the accompanying text.

76. Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 33, 16 U.S.C. §§ 1801-82 (1976).

77. 33 U.S.C. §§ 151-232 (1976), prescribe the enforcement of navigational safety rules.

78. *See* Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1593-94, § 58(a)-(c) (amending 33 U.S.C. § 1321 (1976)).

79. *See* note 56 *supra*.

The high seas, on the other hand, present a different set of challenges. Since the United States will presumably have the necessary technology and wherewithal to engage in OTEC activities on the high seas for research as well as for commercial purposes, perhaps the United States could seek to modify ICNT at the next session to specifically exclude OTEC activities from the competence of ISA. However, if the current discussion in LOS III negotiations on the deep seabed regime is any indication of what might be the regime pertaining to OTEC activities, such prospects do not look promising. The developing countries seek a strong ISA and probably will not accept OTEC activities being excluded from its jurisdiction, for they could argue that OTEC uses a resource covered under the concept "common heritage of mankind." If a treaty does not emerge, the United States could rely upon a reasonable use theory to engage in OTEC activities on the high seas.

The DPA offers a model of legislation for this purpose. The U.S. Congress specifically declared therein that nothing in the Act "shall be construed to affect the legal status of the high seas, the superjacent airspace, or the seabed and subsoil, including the Continental Shelf."[80] The U.S. President is authorized and requested under the Act to enter into negotiations with the neighboring governments of Canada and Mexico to determine "the desirability of undertaking joint studies and investigations designed to . . . eliminate any legal and regulatory uncertainty."[81] As a condition to the issuance of a license for the ownership, construction, and operation of a deepwater port, the Secretary of Transportation must determine that "the deep water port will not unreasonably interfere with international navigation or other reasonable uses of the high seas, as defined by treaty, convention, or customary international law."[82] Also, the designation of safety zones is "[s]ubject to recognized principles of international law,"[83] and the Secretary is required to prescribe various regulations which relate to activities involved in site evaluation and preconstruction testing at potential deepwater locations which may interfere with au-

80. *Id.* § 1501(b).
81. *Id.* § 1521(2).
82. *Id.* § 1503(c)(4).
83. *Id.* § 1509(d)(1).

thorized uses of the outer continental shelf.[84] Additionally, the environmental review criteria which are to be used to evaluate a proposed deepwater port include "the effect on alternate uses of the oceans and navigable waters, such as scientific study, fishing, and exploitation of other living and nonliving resources."[85] The duration of a license is limited to twenty years.[86]

2. *Federal-State Issues Related to OTEC Devices*[87]

In the United States' coastal waters, there still remain unresolved questions regarding the demarcation of authority between the Federal government and the adjacent coastal States. Further uncertainty is likely when the United States decides to expand its territorial seas to a twelve-mile limit and subsequently to claim its 200-mile EEZ; the two probable prospects with or without a comprehensive Law of the Sea treaty. The primary question is, what would be the States' rights in the newly acquired territory?

Since Federal-State jurisdictional issues may affect the research and demonstration phase of OTEC, as well as its advanced development phase for commercial purposes, this section will briefly describe, in an historical context, the current law on Federal-State jurisdiction in coastal areas, which will be followed by a discussion of the probable impacts of the United States extension of its boundaries in the oceans on Federal-State authority in the extended zones and on OTEC research and development.

a. *Current Law*

The 1945 Truman Proclamation,[88] which extended United States' jurisdiction to its continental shelf, left unresolved the question of Federal versus State authority over the shelf.[89] However, in a number of cases in the following five years[90] the

84. *Id.* § 1504(b)(2). The regulations are to be subject to recognized principles of international law. *Id.* § 1509(a).

85. *Id.* § 1505(a)(3).

86. *Id.* § 1503(h).

87. For a thorough and incisive study of Federal-State issues in the U.S. coastal waters, see M. BALL, LAW OF THE SEA: FEDERAL-STATE RELATIONS AND THE EXTENSION OF THE TERRITORIAL SEA (The Dean Rusk Center for International and Comparative Law, University of Georgia, Monograph No. 1, 1978) [hereinafter cited as M. BALL].

88. *See* note 38 *supra.*

89. *See* 13 DEP'T STATE BULL. 484 (1945).

90. *See, e.g.*, U.S. v. Louisiana, 339 U.S. 699 (1950); U.S. v. Texas, 339 U.S. 707 (1950); U.S. v. California, 332 U.S. 19, 38-39 (1947).

Supreme Court held that the Federal government had paramount rights in and full dominion over the resources in the territorial sea. Since several States had already granted leases for offshore oil production in the three-mile limit, these Supreme Court decisions generated strong political pressure,[91] to which the U.S. Congress responded in May 1963, by enacting the Submerged Lands Act.[92] This Act gave the States title and ownership of land and resources lying beneath the water extending seaward to its three-mile limit,[93] subject, however, to the continued U.S. authority and rights over such lands and waters "for the purposes of navigation or flood control or the production of power."[94] Under the Act, the United States expressly retained "all its navigational servitude and rights in and powers of regulation and control of said lands and navigable waters for the constitutional purposes of commerce, navigation, national defense, and international affairs."[95]

Six years after the enactment of the statute, a Federal district court specifically recognized the paramount power of the United States to control such waters for the purposes of navigation in interstate and foreign commerce.[96] More recently, Federal courts have confirmed that under the Act, Congress did not surrender to the States its constitutional power to regulate foreign commerce,[97] and have given recognition to the primacy of ongoing Federal interests in the seabed,[98] over the superjacent waters and their resources,[99] and surface activity in the three-mile territorial sea.[100]

In August 1953, just three months after the enactment of

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91. *See, e.g.*, E. BARTLEY, THE TIDELANDS OIL CONTROVERSY 68-74, 88 (1953); Krueger, *The Development and Administration of the Outer Continental Shelf Lands of the United States*, 14 ROCKY MTN. MINERAL L. INST. 643, 674-77 (1968); Comment, *Jurisdiction Over the Seabed: Persistent Federal-State Conflicts*, 12 URBAN L. ANN. 291 (1976).

92. 43 U.S.C. §§ 1301-1315 (1970). For legislative history and purpose of the Act, *see* [1953] U.S. Code Cong. & Ad. News 1385.

93. 43 U.S.C. § 1311(a),(b)(1970).

94. *Id.* § 1311(d).

95. *Id.* § 1314(a).

96. *See* Organized Village of Kake v. Egan, 174 F. Supp. 500 (D. Alaska 1959).

97. U.S. CONST., art. I, § 8 empowers Congress to regulate all aspects of foreign commerce.

98. *See* Zabel v. Tabb, 430 F.2d 199 (5th Cir. 1970), *cert. denied*, 401 U.S. 910; United States v. Rands, 389 U.S. 121, 127 (1967).

99. *See, e.g.*, Douglas v. Seacoast Products, Inc., 431 U.S. 265, 283-87 (1977).

100. *See, e.g.*, Ray v. Atlantic Richfield Co., 98 S. Ct. 989 (1978).

the Submerged Lands Act, the Outer Continental Shelf Lands Act[101] implemented the 1945 Truman Proclamation by declaring the policy of the United States: "that the subsoil and seabed of the outer Continental Shelf appertain to the United States and are subject to its jurisdiction, control, and power of disposition."[102] While the Act recognizes "the character as high seas of the waters above the outer Continental Shelf," thus leaving unaffected the right to navigation and fishing in such waters,[103] it specifically provides that:

> The Constitution and laws and civil and political jurisdiction of the United States are extended to the subsoil and seabed of the outer Continental Shelf and to all artificial islands and fixed structures which may be erected thereon for the purpose of exploring for, developing, removing, and transporting resources therefrom, to the same extent as if the outer Continental Shelf were an area of exclusive Federal jurisdiction located within a State: *Provided, however,* That mineral leases on the outer Continental Shelf shall be maintained or issued only under the provisions of this subchapter.[104]
>
> To the extent that they are applicable and not inconsistent with . . . Federal laws and regulations, . . . the civil and criminal laws of each adjacent State as of August 7, 1953 are declared to be the law of the United States for that portion of the subsoil and seabed of the outer Continental Shelf, and artifical islands and fixed structures erected thereon.[105]

Under the Act, the Coast Guard is authorized to make and enforce regulations "with respect to lights and other warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on the islands and structures" erected on the Outer Continental Shelf (OCS).[106] While the Secretary of the Interior is authorized to administer and regulate the leasing of the OCS,[107] the Secretary of the Army is authorized to prevent obstruction to navigation which may be caused by artifical islands and fixed structures located on OCS.[108] The Act provides for the application of the civil and

101. 43 U.S.C. §§ 1331-43 (1970). For legislative history and purpose of the Act, *see* [1953] U.S. Code Cong. & Ad. News 2177.

102. 43 U.S.C. § 1332 (1970).

103. *Id.* § 1332(b).

104. *Id.* § 1333(a)(1).

105. *Id.* § 1333(a)(2).

106. *Id.* § 1333(e)(1).

107. *Id.* § 1334(a)(1).

108. *Id.* § 1333(f).

criminal law of coastal States existing on the effective date of the Act to the activities on the subsoil and seabed of OCS including artificial islands and fixed structures erected there.[109] In 1975 Congress amended the Act to apply current State laws.[110]

These statutes did not resolve the Federal-State controversy regarding the proper authority and control for the exploration and exploitation of OCS. The States continued to claim a stronger voice in the decisionmaking process because of the direct impacts on the States of OCS development. In response to a U.S. complaint against thirteen Atlantic coastal States that they were interfering with the exclusive U.S. rights to explore and exploit the natural resources of OCS, in 1975 the Supreme Court decided *United States v. Maine,*[111] in which it reaffirmed its earlier decisions that, as attributes of its external sovereign powers, the Federal government has "paramount rights in the marginal seas."[112]

More recently, however, the recognition of the coastal State's interest in activities over OCS has been evident in several new developments, including: (1) the formation of regional OCS advisory boards with State representatives on them;[113] (2) the devising of a new system under which the Department of the Interior will share with the States information regarding lease tracts;[114] and (3) the 1978 amendments to the Outer Continental Shelf Lands Act[115] under which States will be given a significant role in decisionmaking pertaining to leasing.[116]

Several other Federal statutes permit Federal-State participation in planning offshore activities,[117] including the Deep-

109. *Id.* § 1333(a)(2).

110. 43 U.S.C.A. § 1333(2) (Supp. 1978).

111. 420 U.S. 515 (1975).

112. *Id.* at 522-23.

113. The board's function is to advise the Secretary of the Interior on matters of discretionary authority under the OCS Lands Act. *See* U.S. DEP'T OF THE INTERIOR, GEOLOGICAL SURVEY, POLICIES, PRACTICES, AND RESPONSIBILITIES FOR SAFETY AND ENVIRONMENTAL PROTECTION IN OIL AND GAS OPERATIONS ON THE OUTER CONTINENTAL SHELF 5 (1977), cited in M. BALL, *supra* note 87, at 42 n. 159.

114. 43 Fed. Reg. 3883 (1978) (to be codified at 30 C.F.R. § 250.34); 43 Fed. Reg. 3887, 3889 (1978) (to be codified at 30 C.F.R. § 252); 43 Fed. Reg. 3895 (1978) (to be codified at 30 C.F.R. § 3301.8).

115. President Carter signed the 1978 Outer Continental Shelf Lands Act Amendments on Sept. 22, 1978, Pub. L. No. 95-372, 92 Stat. 629.

116. *Id.* Title II, § 208 (adding a new § 19), 92 Stat. 652-53.

117. *See, e.g.,* The Federal Water Pollution Control Act (FWPCA), 33 U.S.C. §§

water Port Act[118] and the Coastal Zone Management Act (CZMA).[119]

Under DPA, interested States are given an advisory role both in the formulation of regulations to carry out the purposes of the Act,[120] and in the issuance of deepwater port licenses.[121] Deepwater ports within the three-mile territorial waters of the United States are excluded from the Federal licensing scheme,[122] "thereby leaving deepdraft harbors under the licensing authority of the States and the Corps of Engineers."[123] A noteworthy feature of the Federal-State sharing of authority in DPA is that the Secretary of Transportation is not to issue a license to own, construct, or operate a deepwater port facility without the approval of the governor of each adjacent coastal State,[124] which effectively grants the governor veto power over the deepwater port application.[125] A State is to be so designated by the Secretary when it would be directly connected by pipeline or would be located within fifteen miles of a proposed deepwater port.[126] Also, the Secretary could designate a State as an adjacent coastal State if he determines, pursuant to a request by the State and the recommendation of the administrator of the National Oceanic and Atmospheric Administration (NOAA) that "there is a risk of damage to the coastal environment of such State equal to or greater than the risk posed to a State directly connected by pipeline to the proposed deepwater port."[127]

Adjacent coastal States are also given preferential rights

1251-1376 (1976), *as amended by* The Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566; The Fishery Conservation and Management Act (FCMA), Pub. L. No. 94-265, 90 Stat. 331 (codified in several sections of 16 & 22 U.S.C., the Act provides for the participation of States' representatives on Regional Fisheries Management Councils (16 U.S.C. § 1852 (1976)); Marine Protection, Research and Sanctuaries Act of 1972, 16 U.S.C. §§ 1401-34 (1976); The Endangered Species Act, 16 U.S.C. §§ 1531-43 (1976); and The Marine Mammal Protection Act, 16 U.S.C. §§ 1361-1407 (1976)).

118. 33 U.S.C. §§ 1501-24 (1976).

119. 16 U.S.C. §§ 1451-64 (1976).

120. 33 U.S.C. § 1504(a),(b) (1976).

121. *Id.* § 1503(c)-(e).

122. *Id.* § 1502(10).

123. *See* 33 U.S.C. § 403 (1976).

124. 33 U.S.C. § 1500(b) (1976).

125. *Id.* § 1503(c)(9).

126. *Id.* § 1508(a)(1).

127. *Id.* § 1508(a)(2). The regulations implementing the Act are contained in 33 C.F.R. § 148 (1977).

to deepwater port licenses under DPA.[128] As an original licensee, a State may transfer its license provided the transferee complies with the requirements of the Act.[129] Also, the law of the nearest adjacent coastal State—the State "whose seaward boundaries, if extended beyond 3 miles, would encompass the site of the deepwater port"[130]—is made applicable under the Act to licensed deepwater ports. Another notable provision is the authorization of an adjacent coastal State to "fix reasonable fees for the use of a deepwater port facility."[131] Such fees are subject to the approval of the Secretary of Transportation and are not to exceed economic, environmental, and administrative costs of such State.[132]

CZMA is designed to protect coastal resources by encouraging States to manage the coastal areas.[133] Federal-State partnership is envisaged, for the Act requires that federally conducted or supported activity within or directly affecting the coastal zone must be carried out in a manner "which is, to the maximum extent practicable, consistent with approved state management programs."[134] This "consistency" requirement is made applicable specifically to the OCS development activity.[135] "A set of Federal regulations defines terms and establishes guidelines for the approval of coastal zone management programs."[136]

CZMA Amendments of 1976 created a coastal energy impact program[137] which authorizes $800 million for the creation of a coastal energy impact fund for loan guarantees and grants to States which must have an approved coastal zone management program or be making satisfactory progress in developing

128. 33 U.S.C. § 1504(h)(2)(i)(2)(A) (1976).

129. *Id.* § 1503(f).

130. *Id.* § 1518(b).

131. *Id.* § 1504(h)(2).

132. *Id.*

133. *See generally* Hollings, *Congress and Coastal Zone Management*, 1 COASTAL ZONE MANAGEMENT J. 115 (1973); Knecht, *Coastal Zone Management—A Federal Perspective, id.* at 123; Zile, *A Legislative Political History of the Coastal Zone Management Act of 1972, id.* at 235; *Symposium—Implementation of the Coastal Zone Management Act of 1972*, 16 WM. & MARY L. REV. 717-822 (1975).

134. 16 U.S.C. §§ 1456(c)(1),(2) (1976).

135. 16 U.S.C. §§ 1453(4)(i), 1456(c)(3)(B) (1976).

136. *See* 15 C.F.R. pt. 923 (1978). For NOAA regulations implementing the consistency provisions, see 43 Fed. Reg. 10,510-33 (1978) (to be codified at 15 C.F.R. pt. 930).

137. 16 U.S.C. § 1456(a) (1976).

such a program.[138] Loans and loan guarantees also are authorized to aid coastal States in financing new or improved public facilities and services needed to handle new or expanded coastal energy activities. Additionally, grants are authorized from the fund to help the States plan for the consequences of increased coastal energy activities and to aid the States in preventing or mitigating unavoidable losses of valuable environmental and recreational resources.[139]

b. *Federal-State Issues in Light of LOS III*

When the United States extends its boundaries to a twelve-mile territorial sea and a 200-mile EEZ, two questions become pertinent: (1) would the State zone be extended from three to twelve miles? and (2) if such a State expansion were to take place, would the Federal government preempt the States in energy matters, including OTEC? Who would be the licensing Authority and what would be the licensing requirements? Since the coastal State is given police power over such islands and structures, the question arises as to which laws would be made applicable to them. In regard to the last question, the model provided by the Outer Continental Shelf Lands Act,[140] and DPA,[141] applies the law of the adjacent coastal State. This would seem to be the desirable approach to adopt. Thus, the law of the State where the transmission cables go ashore will apply to the extent that it is not inconsistent with Federal law. Other possibilities include general maritime law or the law of the State in which the OTEC firm is incorporated.

c. *Recommendations*

The primary concern regarding Federal-State jurisdictional issues in adjacent coastal waters relates to an efficient management of the 200-mile marine zone. There are arguments in favor of either leaving the coastal States' boundaries fixed at the three-mile limit or extending them to twelve miles. A commentator has aptly summarized the pros and cons:

138. *See id.* §§ 1456(a),(c),(d), 1464(b). *See generally* Hildreth, *The Operation of the Federal Coastal Zone Management Act as Amended*, 10 NAT. RESOURCES LAW. 211, 221-23 (1977).

139. *See* Hildreth, *supra* note 138, at 222-23.

140. 43 U.S.C. §§ 1331-43 (1970).

141. 33 U.S.C. §§ 1501-24 (1976).

> On the Federal side arguments could be advanced that the interest of inland States and of all citizens, the history of the sea as of national strategic importance, as well as greater naval and administrative capacity, weigh in favor of Federal control.
>
> On behalf of the States, it could be maintained that leaner, more responsive agencies, closer familiarity with daily, mundane marine-related affairs, and a diversity of local concerns render the States the preferred government to exercise authority over an expanded territorial sea.[142]

Irrespective of who owns the extended stretch of nine miles, what is sorely needed is a cohesive U.S. policy for a 200-mile maritime zone and an efficient and strong institutional structure to implement it. At present, several departments in the Federal government are involved in both the formation and the implementation of national policies in adjacent coastal waters.[143] Instead of a piecemeal legislative effort as a U.S. response to the demands posed by the extension of its maritime boundaries, an imaginative Federal oceans policy should be fashioned which will facilitate an equitable resolution of Federal-State issues.

During the last decade, a number of studies and reports on U.S. marine policy, including the 1969 report of the Commission on Marine Science and Resources (Stratton Commission), and reports by the National Advisory Committee on Oceans and Atomosphere (NACOA), have recommended the creation of a strong, independent, policy-setting body which could effectively coordinate national ocean policies and implementing activities.[144] The argument for the formation of a single policy-formulating authority is that it can balance the various national interests which are often competing—national security, national economy, international trade, and the global ecosystem. The argument against such centralization is that a specialized oceans agency would detract from important programs based on functional activities, such as OCS gas and oil exploration, which is at present handled by the Department of the Interior, and "should remain in Interior because of the land

142. M. BALL, *supra* note 87, at 23-24.

143. *See id.* at 54-55.

144. For a concise report on these activities, see A. WILSON, U.S. OCEAN POLICY: COORDINATION AND CONTROL, 1 MARINE POL'Y REP., No. 6 (Center for the Study of Marine Policy, College of Marine Studies, University of Delaware, Sept. 1978).

development expertise of the Bureau of Land Management and the U.S. Geological Survey."[145]

In October 1977, Senate bill S.2224[146] was introduced "to establish a national ocean policy and to set forth the missions of the National Oceanic and Atmospheric Administration [NOAA]." Asserting that U.S. ocean policy had long suffered from disparate processes and duplication of effort, the bill seeks to strengthen NOAA as the leading civilian ocean policy agency responsible for coordinating national ocean policy. The current situation is aptly summarized in a recent report by an observer:

> The important question is whether the ocean community should settle for the problems engendered by the largely uncoordinated program activities in the marine environment, or demand Federal action to improve control of governmental policies. No executive agency oversees all ocean programs. No Congressional committee oversees all of the great number of program interests expressed through all the competing uses of the marine environment. There is no major policy perspective against which specific development options can be judged for cohesiveness. There is no responsible body to assist the President in the formulation of immediate goals based on long-term national interest. There exists no criterion by which international or domestic concerns can be evaluated. The ocean environment encompasses such a vast array of important interests and considerations that muddling through by reacting to emergent needs is not in the best interest of the nation.[147]

Proposals for the creation of a strengthened policy-setting body include the formation of a Cabinet-level Marine Affairs Council,[148] a public corporation such as COMSAT, or a public body such as the Tennessee Valley Authority.[149]

Based upon a thorough appraisal and evaluation of the current U.S. offshore policies, especially of Federal-State authority and control in a myriad of activities occurring in this area, it is imperative that the administration of the government's oceans programs be centralized in a strong, effective, and independent body, and that Federal-State jurisdictional

145. *See id.* at 2.

146. Introduced in U.S. Senate on Oct. 20, 1977. Hearings were held on April 6, 1978.

147. A. WILSON, *supra* note 144, at 4.

148. NACOA made this recommendation in June 1977. *Id.* at 3.

149. *See* M. BALL, *supra* note 87, at 56-57.

and regulatory issues be resolved equitably. The next section will examine some of these issues, especially the ones relevant in the context of OTEC siting and development.

B. *Regulatory Issues*

Regulatory issues will be considered in this section in two contexts— international and Federal-State. This examination will be prefaced by a brief investigation of the legal status of OTEC devices.

1. *Legal Status of OTEC Devices*

It is important to determine the legal status of OTEC devices because many rights and obligations of such entities and those owning, operating, and manning them will flow from such a determination. The conferring of legal status on OTEC devices, whether fixed to the ocean floor or moveable either for stationkeeping or for grazing on the high seas, will legitimize their presence as well as their operation. The issue is two-fold: (1) who would authorize their presence and operation by licensing them? (the analogy is that of a flag state authorizing the use of its flag on a vessel), and (2) since traditionally a regulatory mechanism exists to regulate activities of structures designed as vessels on the oceans, would OTEC devices be considered vessels or quasi-vessels, at least for some purposes? The question of licensing will be discussed in the next section examining international and Federal-State regulatory mechanisms.

Whether an OTEC device is considered a vessel will not be dispositive of the complex legal issues raised by OTEC presence as a new user of the sea. There are, however, existing international guidelines, standards, and regulations applicable to vessels which have been established by the long standing use of the oceans for commercial navigation. It is useful to inquire whether the existing standards and regulations—those of safety, design and construction, collision and navigation, communication, and labor—will apply to OTEC devices and whether these regulations need to be modified in order to meet OTEC needs. Otherwise, new arrangements will have to be devised. In the national context, giving OTEC devices the sta-

150. *See generally* Nyhart, *OTEC Structures as Vessels*, in ASIL STUDY, *supra* note 70, at 213-33. *See also* Nanda, *The Legal Status of Surface Devices Functioning at Sea other than Ships (Drilling Rigs, Offshore Platforms, etc.)*, 26 AM. J. COMP. L. (Supp.) 233 (1978).

tus of vessels could confer upon them substantial economic benefits, in view of the fact that the U.S. shipping industry is subsidized by the United States government by means of providing mortgage guarantees, construction and operation subsidies, and tax advantages.[151]

Only during the last decade have international agreements regulating activities on the sea broadened their reach to cover OTEC-type structures. The 1969 Convention on Intervention on the High Seas, dealing with oil pollution casualties, set the stage by defining a ship as: "(a) any sea-going vessel of any type whatsoever, and (b) any floating craft with the exception of an installation or device engaged in the exploration of resources of the seabed and ocean floor and the subsoil thereof."[152] The Convention added a distinct category of "floating craft" to that of "vessel," the term traditionally used in such conventions. The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[153] defined vessels to include "floating craft, whether self-propelled or not."[154] The Convention called upon each contracting party to apply means required to implement the present convention of all "vessels . . . and fixed or floating platforms under its jurisdiction believed to be engaged in dumping."[155]

The 1973 Convention for the Prevention of Pollution from Ships[156] defines ship to mean "a vessel of any type whatsoever

151. *See, e.g.*, on ship mortgages, 46 U.S.C. §§ 911-84 (1970); subchapter XI, "Federal Ship Mortgage Insurance," of the Merchant Marine Act of 1936, 46 U.S.C. §§ 1271-80 (1970 & Supp. IV 1974), *as amended by* the Federal Ship Financing Act of 1972, Pub. L. No. 92-507. *See generally* Smith, Jr., *Ship Mortgages*, 47 TUL. L. REV. 608 (1973). On subsidies and tax advantages, see subchapters V and VI of The Merchant Marine Act of 1936, 46 U.S.C. §§ 1151-83(a) (1970 & Supp. IV 1974), *as amended by* The Negotiated Shipbuilding Contracting Act of 1976, Pub. L. No. 94-373 §§ 2,3,90 Stat. 1042; Internal Revenue Code, 26 U.S.C. § 861(e)(1976). *See generally* Cook, Jr., *Government Assistance in Financing Title XI Federal Guarantees*, 47 TUL. L. REV. 653 (1973); Kominers, *Federal Government Aids to Merchant Shipping, id.* at 691.

152. Article II (2), International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, *done* Nov. 29, 1969, 26 U.S.T. 765, T.I.A.S. No. 8068, *reprinted in* 9 INT'L LEGAL MATERIALS 25 (1970) (entered into force May 6, 1975).

153. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, *done* Dec. 29, 1972, 26 U.S.T. 2403, T.I.A.S. No. 8165 (entered into force August 30, 1975).

154. *Id.* art. III(2).

155. *Id.* art. VII(1)(c).

156. International Convention for the Prevention of Pollution from Ships, *done* Nov. 2, 1973, *reprinted in* 12 INT'L LEGAL MATERIALS 1319 (1973).

operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms."[157] In addition to ships entitled to fly the flag of the party, the Convention also applies to "ships not entitled to fly the flag of a Party but which operate under the authority of a Party."[158] Similarly, the 1976 Convention on the International Maritime Satellite Organization[159] defines a ship broadly as "a vessel of any type operating in the marine environment. It includes *inter alia* hydrofoil boats, air-cushion vehicles, submersibles, floating craft and platforms not permanently moored."[160] It appears that the terms being used now such as "floating craft," and "floating platforms," would include OTEC-type structures in the ocean environment. However, there are many conventions adopted under the auspices of the International Maritime Consultative Organization (IMCO), which do not cover OTEC-type facilities.[161] Which of these conventions should be made applicable to OTEC will depend upon the purpose of the convention and the probable benefit of its application to OTEC activities—both to the research and demonstration, and the development phases—so that OTEC commercialization is facilitated and expedited.

ICNT provisions on pollution, on the other hand, would cover OTEC devices. Dumping is defined to include wastes or other matter from "vessels, aircraft, platforms or other man-made structures at sea."[162] The terms used are "installations and devices,"[163] and "vessels, installations, structures and

157. *Id.* art. 2(4).

158. *Id.* art. 3(1).

159. Convention on the International Maritime Satellite Organization, *done* Sept. 3, 1976, *reprinted in* 15 INT'L LEGAL MATERIALS 1051 (1976).

160. *Id.* art. 1(f).

161. These conventions would include: International Convention for the Safety of Life at Sea, (SOLAS Convention), *signed* June 17, 1960, 16 U.S.T. 185, T.I.A.S. No. 5780, 536 U.N.T.S. 27; 1974 SOLAS Convention, *reprinted in* 14 INT'L LEGAL MATERIALS 959 (1975); International Convention for the Prevention of Pollution of the Sea by Oil, *opened for signature* May 12, 1954, 12 U.S.T. 2989, T.I.A.S. No. 4900, 327 U.N.T.S. 3, *as amended by* Amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, *done* Apr. 11, 1962, 17 U.S.T. 1523, T.I.A.S. No. 6109, 600 U.N.T.S. 332; International Convention on Load Lines, *done* Apr. 5, 1966, 18 U.S.T. 1857, T.I.A.S. No. 6331, 640 U.N.T.S. 133; and International Convention on Civil Liability for Oil Pollution Damage, *done* Nov. 29, 1969, *reprinted in* 9 INT'L LEGAL MATERIALS 45 (1970).

162. ICNT, art. 1(1)(5)(a)(i & ii).

163. *Id.* art. 195(3)(c & d). The provisions cover all installations and devices in the marine environment.

other devices," flying the flag of the mining state or of its registry.[164] Therefore, regardless of the status of OTEC devices, they would be regulated under ICNT.

2. *International Regulatory Mechanisms and OTEC*[165]

a. *Current Law*

It should come as no suprise that no regulatory mechanism exists for specific application to OTEC, for as a new technology it has yet to make its debut as a user of ocean space. Of course, the primary purpose of providing a regulatory framework is to reduce uncertainty and risks attendant on pursuing OTEC activities, an important consideration not only for prospective investors, but also for eventual commercialization of OTEC.

It seems likely that in the initial stages of OTEC development for research and demonstration purposes and subsequently for commercial operation, broader guidelines and standards with built-in flexibility, rather than narrow, precise norms will be established. Developments in another relatively new area, transnational pollution,[166] show that the important tasks of setting and harmonizing standards and establishing appropriate machinery for implementation, usually occur first in regional settings[167] and appear later in a global setting where such need and feasibility have been clearly demonstrated. Because of unique regional situations, it is unrealistic to expect or even pursue universality and uniformity. The Regional Seas Program of the United Nations Environmental Program (UNEP),[168] which has developed in the last four years and is still developing action plans for seven regions—Mediterranean, Gulf of Arabia, Red Sea, Gulf of Guinea, Carribbean and adjacent regions, East Asian Seas, and South Pacific—illustrates regional efforts on environmental management.

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164. *Id.* art. 210(2).

165. *See generally* Faron, *International Regulatory Aspects of OTEC Development and Operation,* in ASIL STUDY, *supra* note 70, at 86-148.

166. *See generally* J. BARROS & D. JOHNSTON, THE INTERNATIONAL LAW OF POLLUTION (1974); Nanda, *The Establishment of International Standards for Transnational Environmental Injury,* 60 IOWA L. REV. 1089 (1975).

167. *See generally* Nanda, *supra* note 166, at 1101-08, 1126-27; note 168 *infra;* Okidi, *Toward Regional Arrangements for Regulation of Marine Pollution,* 4 OCEAN DEV. & INT'L L. 1 (1977).

168. *See* International Center, Industry and Environment, *Executive Report No. 30,* Oct. 30, 1978. UNEP has established a special Regional Seas Programme Activity Centre at its Geneva office.

Several existing arrangements regulating other activities in ocean space could be construed to cover OTEC-type structures and activities on them, or with modifications, could be made applicable to OTEC. A few examples of such arrangements relevant to OTEC follow for illustrative purposes.

The results of the last major effort to provide a framework for activities in ocean space, the 1958 Geneva Conventions, do provide some basis for regulating OTEC. For example, the freedoms enumerated in the High Seas Convention—navigation, fishing, laying of submarine cables and pipelines, and overflights[169]—are not exhaustive and it could be argued that OTEC activities do constitute a "reasonable use" of the high seas[170] and fall within the scope of the freedoms granted under the Convention.[171] Other pertinent provisions of the Convention include those authorizing states to lay submarine cables, pipelines and communications lines,[172] and those related to the states' regulation of the ocean pollution caused by their activities.[173]

The 1958 Convention on the Continental Shelf[174] contains prohibitions against: (1) obstruction of the laying and maintenance of submarine cables and pipelines on the continental shelf,[175] (2) the rights of coastal states affecting the legal status of the superjacent waters of the high seas,[176] and (3) "any unjustifiable interference with navigation, fishing or the conservation of the living resources of the sea."[177] It also provides for the protection of "fundamental oceanographic or other scientific research carried out with the intention of open publication."[178] As noted earlier, however, notwithstanding the provisions of the Convention on the Continental Shelf, the recent developments regarding extensive coastal states' claims in their offshore areas, especially the developments regarding EEZ, make it highly unlikely that OTEC activities could be conducted on

169. Art. 2 of the High Seas Convention, note 15 *supra*.
170. *See* notes 56-57 *supra* and the accompanying text.
171. *Id.*
172. The High Seas Convention, *supra* note 15, arts. 26-29.
173. *Id.* arts. 24-25.
174. *See* note 15 *supra*.
175. *Id.* art. 4.
176. *Id.* art. 3.
177. *Id.* art. 5(1).
178. *Id.*

another state's continental shelf without its consent.[179]

The question of who would authorize operation of OTEC devices on the high seas is at present unsettled. Would the current state practice on vessels, the flag state approach (which raises a further issue of the flags of convenience),[180] be made applicable; or, would the OTEC issue become as controversial as is the deep seabed mining issue at present?[181] It is premature to suggest the precise nature of the conditions and arrangements for OTEC activities on the high seas, for the current debate on the seabed mining issue and the conclusions which are finally reached at LOS III[182] will substantially affect the OTEC licensing and operations.[182]

As noted earlier, most existing standards and regulations affecting activities in ocean space apply primarily to vessels, a term recently broadened to include OTEC-type structures.[183] Institutional arrangements, both in setting standards and providing mechanisms for compliance are in various stages of development. One commentator describes the current state of affairs:

> These arrangements cover areas such as safety, navigational aids, collision avoidance, design and construction regulation, inspection, certification, port entry, liability, communications, and labor and crew qualification. Most of these arrangements arise in national rather than international contexts, in most cases because international standards have not been agreed upon, or because nations have not been willing to subject themselves to international authority. Some of these arrangements have been developed into conventions, which are binding on parties; others are still undergoing analysis by such forums as IMCO's Legal Committee in order to match institutional arrangements to the realities of ocean use. . . . International forums have just begun to regulate moored platforms and other relatively novel marine technology. If OTEC devices are considered vessels, which is likely, at least for grazing type OTECs, then the various institu-

179. *See* notes 43-51 *supra* and the accompanying text.

180. *See generally* B. BOCZEK, FLAGS OF CONVENIENCE (1962); McDougal & Burke, *supra* note 16, at 1008-1140.

181. In addition to the series cited in note 59 *supra*, *see generally* Burton, *Freedom of the Seas: International Law Applicable to Deep Seabed Mining Claims*, 29 STAN. L. REV. 1135 (1977); Charney, *Law of the Sea: Breaking the Deadlock*, 55 FOR. APP. 598 (1977), Galey, *From Caracas to Geneva to New York: The International Seabed Authority as a Creator of Grants*, 4 OCEAN DEV. & INT'L L. 171 (1977).

182. *Supra* note 181.

183. *See* notes 150-64 *supra* and the accompanying text.

> tional arrangements currently providing norms and rules of vessel operation may apply or be amended to apply to OTEC development.[184]

Regulations applicable to marine pollution which might have a bearing on OTEC activities will be discussed in the next section dealing with environmental problems.[185]

b. *Recommendations*

It is desirable to devise a regulatory scheme which assists OTEC commercialization by providing certainty to prospective investors. What must be carefully avoided is overregulation or an inflexible and cumbersome regulatory system which can be stifling, especially for a new technology.

It is not to be expected that a new international regulatory mechanism will be established in the near future under a convention that deals specifically with OTEC operations. Experience shows that it was only in the aftermath of the *Torrey Canyon* disaster[186] that the current major conventions on marine pollution from ships were negotiated—the 1969 conventions on civil liability[187] and intervention on the high seas,[188] and the 1973 convention on prevention of pollution from ships.[189] However, several existing mechanisms could be applied to OTEC activities. To illustrate, several IMCO conventions currently applicable to vessels might be modified and made applicable to OTEC devices. Similarly, a functional approach is possible, authorizing specialized U.N. agencies to bring OTEC devices and operations under their regulatory framework: the International Energy Agency, because of OTEC's involvement with energy production; the World Meteorological Organization (WMO), due to OTEC's research activities; the Food and Agricultural Organization (FAO), if OTEC generated energy is used for producing fertilizers or in aquaculture; and the United Nations Environmental Program, owing to the potential environmental effects of OTEC operations. Of course, ISA could assume jurisdiction because of its umbrella function over the

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184. Faron, *supra* note 165, at 96-97 (footnotes omitted).

185. *See* notes 240-72 *infra* and the accompanying text.

186. *See generally* G. GILL, F. BECKER & T. SOFER, THE WRECK OF THE TORREY CANYON (1967); Nanda, *The "Torrey Canyon" Disaster: Some Legal Aspects*, 44 DEN. L. J. 400 (1967).

187. *Supra* note 161.

188. *Supra* note 152.

189. *Supra* note 156.

proposed deep seabed regime.[190] This is possible, especially in veiw of the "common heritage" concept,[191] the probable OTEC conflict with deep seabed mining activities,[192] or the possibly environmentally adverse effects of OTEC operations.[193]

It is recommended that, in addition to the prescription of unilateral U.S. regulations dealing with issues related to licensing and registration, safety, conflicting sea uses, communications, import and export, foreign labor, insurance, liability and compensation schemes, etc., attention be given now to the devising of imaginative bilateral and regional arrangements to apply to situations such as the following:

1. The resolution of apparently competing interests of a coastal state and the licensing/registry state, where a foreign registered/licensed OTEC device is operating adjacent to a coastal state EEZ. The coastal state's interest in preventing harmful effects within its EEZ must be acknowledged and accommodated.

2. The use of bilateral or regional schemes under which a combination of a state or states and private enterprises pool their resources, technology, and know-how to enter into arrangements for research and/or commercial purposes, such as, joint ventures to construct, operate, and own OTEC devices in a specific geographic area. The question of such operations on the high seas, of course, will have to be addressed separately, perhaps requiring some sort of global arrangement. The growing experience in working with satellite communication systems might offer useful guidelines.[194]

3. The need for bilateral or regional consultative mechanisms which will address specific issues regarding the management of conflicting claims of ocean uses caused by OTEC presence. Fisheries arrangements[195] and existing agreements between neighbors on international waterways[196] offer useful precedents.

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190. ICNT arts. 154-92.

191. *Id.* art. 136.

192. *See id.* pt. XI (arts. 154-92) and Annexes II & III.

193. *See id.* pt. XII (arts. 193-238).

194. *See generally* Colino, *International Cooperation between Communications Satellite Systems: An Overview of Current Practices and Future Prospects*, 5 J. SPACE L. 65 (1977); Frutkin, *Direct Community Broadcast Projects Using Space Satellites* 3 *id.* at 17 (1975).

195. *See generally* NATIONAL LEGISLATION AND TREATIES RELATING TO THE LAW OF THE SEA 573-86 (U.N. Legislative Series 1976), U.N. Doc. ST/LEG/SER.B/18.

196. *See generally* Nanda, *supra* note 166, at 1101-08.

4. The need for dispute settlement mechanisms.

On the global level, regulations regarding OTEC siting on the high seas might become necessary because of the possible conflicts between competing claimants to ocean uses or between competing claimants to attractive OTEC sites (a contingency not likely to occur in the near future). Thus, mechanisms might have to be devised to set standards and regulations concerning the licensing and operation, and allocation of OTEC sites for settlement of disputes, and to insure the efficient and optimal use of the oceans for OTEC development. In the long run, it might be desirable to establish an International Energy Resources Conservation and Management Agency, and a code of conduct for OTEC activities.

3. *Federal-State Regulatory Mechanisms and OTEC*

a. *Current Law*

The need for a thorough assessment of the current Federal offshore policies and for a Federal-State relationship regarding adjacent coastal waters has been suggested earlier.[197] To deal specifically with OTEC issues, it is necessary to outline a rough approximation of how OTEC exploitation will occur in the next twenty years. In a recent study,[198] Tefft, Kelly, Dick, and Stevenson postulate the following scenario for OTEC exploitation to the year 2025:

The Selected Scenario

U.S. OTEC
Megawatts on Line

1980	85	90	95	00	05	10	15	20	25
	.5	2.5	5	10	50	100	150	200	250

Key Descriptors

1. Successful demonstration of economy of technology and environmental benignity of full systems by 1985 (.5 on line in 85 is demonstration(s) facilities).

2. Federal stimulation of follow-on exploitation by

a. establishment of benevolent legal regime

b. establishment of stimulative development institution

197. *See* notes 142-49 *supra* and the accompanying text.

198. TEFFT, KELLY & MOTLEY STUDY, *supra* note 9.

c. provision of substantial Federal financial incentives

3. Establishment of fostering legal, institutional, and financing framework by 1980.

4. Operations within framework to develop strategic plan for exploitation and to assemble facilities ventures concurrently with demonstration implementation, *i.e.*, 1980 to 1985.

5. Continued operations within framework during 1985 to 2000 at a pace sufficient to establish perfected industrial, legal, institutional, and financial infrastructure by 2000.[199]

The authors conclude that "decisive Federal action will be needed to carry out this scenario. The Executive Branch presently lacks the policy direction and the specific legal authority to take actions in the depth and breadth necessary to build the legal, institutional, and financial framework needed to underlay scenario execution. Thus, new Federal legislation is necessary."[200]

The authors offer a model of Federal legislation which takes into account the necessary interface with international law as well with State interests.[201] They propose the enactment of an "Ocean Thermal Energy Conversion, Development, Exploitation, and Regulation Act of 1980,"[202] which would establish, among other policy objectives, the following: OTEC shall be subject to exclusive Federal regulation; while in the short term, Federal participation in OTEC development, ownership, and/or operation will be necessary to stimulate deployment to meet the established energy generation goals (by the year 2000, a minimum of 10,000 megawatts of installed electric OTEC generation capacity usable within the United States, its territories and possessions and/or on U.S. flag vessels at sea, and of 250,000 megawatts by the year 2025),[203] a long term objective shall be non-Federal development, ownership, and operation.

To carry out these policies, the proposed legislation contains four titles: OTEC Development Financing Association; OTEC Inc.; Duties and Responsibilities of the Secretary of Energy; and Legal Regime.[204]

199. *Id.* at 8.
200. *Id.*
201. *Id.* at 11-24.
202. *Id.* at 10.
203. *Id.* at 11.
204. *Id.* at 12.

The authors provide a detailed institutional framework,[205] the analysis of which is beyond the scope of this paper. However, a few selected Federal-State regulatory issues will be examined here.

On the issue regarding the application of Federal versus State laws to OTEC activities in adjacent offshore areas, it should be noted that extensive case law has developed regarding the applicability of the pertinent Federal or State laws to injuries suffered by workers on fixed or submersible oil-drilling platforms or rigs.[206] Different rules have been applied to injuries occurring on fixed platforms within the three-mile zone as opposed to those occurring beyond the three-mile limit.[207] A landmark decision was a 1969 case, *Rodrigue v. Aetna Casualty & Surety Co.*,[208] in which the U.S. Supreme Court held that State law would apply to fixed offshore platforms in preference to general maritime law. In 1972, the Longshoremen's and Harbor Workers' Compensation Act[209] was amended, allowing a concurrent application of both Federal and State laws in case of an overlap.[210]

However, until Congress enacts comprehensive Federal legislation regarding OTEC, the guidelines on the applicable law are provided by the Supreme Court test of uniformity versus locality or diversity:

> if a case falls within an area in commerce thought to demand a uniform national rule, state action is struck down. If the activity is one of predominantly local interest, state action is sustained. More accurately, the question is whether the state interest is outweighed by a national interest in the unhampered operation of interstate commerce.[211]

More recently, in *Ray v. Atlantic Richfield Co.*,[212] the issue was that of a conflict between Washington State's tanker law regulating oil tankers in Puget Sound,[213] the Ports and Waterways

205. *Supra* note 201; TEFFT, KELLY & MOTLEY, INC., WORKING DRAFT, OTEC DEVELOPMENT, EXPLOITATION, AND REGULATION ACT OF 1980 (1978).

206. For discussion of these cases, see Comment, *Offshore Oil Platforms and Admiralty Law: Rodrigue in Retrospect*, 49 TUL. L. REV. 65 (1975).

207. *Id.*

208. 395 U.S. 352 (1969).

209. Pub. L. No. 92-576, 86 Stat. 1251 (1972), 33 U.S.C. §§ 901-50 (1976).

210. See Comment, *Broadened Coverage Under the LHWCA*, 33 LA. L. REV. 683 (1973).

211. California v. Zook, 336 U.S. 725, 728 (1949).

212. 98 S. Ct. 988 (1978).

213. Wash. Rev. Code Ann. § 88.16.170-190 (Supp. 1978).

Safety Act of 1972 (PWSA),[214] and the Constitution. The Supreme Court found certain safety features in the design and equipment of tankers which were required under Washington law to be invalid in the face of the preempting requirements set by PWSA.[215] The Court applied the uniformity/diversity tests and based its decision on the need for uniformity of safety design requirements. Applying the same test, it also struck down another provision of Washington law, which excluded tankers in excess of 125,000 DWT[216] from Puget Sound. However, the Court upheld another provision, which required that tankers over a certain size "take a Washington State licensed pilot while navigating Puget Sound,"[217] reasoning that this provision was more of an operating rule for local waters.[218]

The issues of licensing, the law applicable to OTEC facilities in adjacent waters, and the potential environmental and administrative burdens upon the coastal States were addressed by DPA in the context of deepwater port facilities and have been noted earlier.[219]

b. *Recommendations*

Federal and State interests coincide in a number of areas which will probably be affected by OTEC development—coastal zone management and land planning, revenue sharing, State costs and fees, and electricity rate regulations. The coastal States have a significant stake because of possible conflicts with other ocean uses, adverse environmental effects, siting of shore-based support facilities, etc. Thus, it will be in the mutual interest of the Federal government and coastal States that a mechanism be devised which is workable and feasible, effective and efficient, environmentally sound, and equitable in its reach while dealing with Federal-State interests.[220] These broad policy objectives should be given effect by a system under which:

1. The licensing and regulatory authority will be the Federal government.

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214. 33 U.S.C. §§ 1221-27, 46 U.S.C. 391(a) (Supp. V 1975). The provision on safety features held invalid is Wash. Rev. Code Ann. § 88.16.190(2) (Supp. 1978).

215. 98 S. Ct. at 996-1000.

216. Wash. Rev. Code Ann. § 88.16.190(1) (Supp. 1978).

217. Wash. Rev. Code Ann. § 88.16.180 (Supp. 1978).

218. 98 S.Ct. at 1000-1002.

219. *See* notes 120-32 *supra* and the accompanying text.

220. *See generally* note 205 *supra*.

2. The DOE/Federal Energy Regulatory Commission (FERC) will be the lead Federal agency to license and regulate OTEC activities, similar to the Department of Transportation/Coast Guard's role as the lead agency for licensing deepwater port facilities under DPA.

3. OTEC facilities in offshore areas will be considered a utility in interstate and foreign commerce and will be subject to regulations and procedures of FERC both as to rate regulation and technical standards.

4. The Coast Guard and the Corps of Engineers will be responsible for navigational safety and seaworthiness pertaining to OTEC facilities.

Such a scheme will accomodate Federal-State interests by providing for:

1. a Federal/State revenue sharing scheme, especially permitting States to recover the economic cost to them of a federal right-of-way for transmission cables through the three-mile territorial sea and also for shore-based facilities;

2. an effective Federal/State consultative mechanism; and

3. administrative advisory boards.

C. *Environmental Considerations*

A recent study has outlined the following environmental problems associated with the deployment of OTEC devices in the ocean:

> (1) the potentially toxic effect on marine life of metallic elements eroded or corroded from heat exchangers; (2) the adverse effect of mixing natural thermocline and salinity gradients; (3) the potentially toxic effects of working fluid seepage into the seawater or seawater into the working fluid; (4) the ecological impacts of concentrations of biocides (such as chlorine) used to prevent biofouling; (5) the safety of workers faced with exposure to chemicals; [and] (6) the effect on the microclimate of slightly lower air and surface temperatures around the plant.[221]

It should, however, be noted that this inquiry into the potentially adverse environmental impact of OTEC activities is speculative. Nonetheless, it is certainly desirable that these issues be addressed at this preliminary stage of OTEC development. The discussion in this section will open with a brief

221. SERI INTERIM DRAFT REP., *supra* note 9, at 137-39.

outline of the domestic (Federal-State) issues, and will focus primarily on international aspects of OTEC-related environmental issues.

1. *Domestic (Federal-State) Issues*

Potential environmental impacts from OTEC facilities in coastal waters include those from construction and operation of such facilities, cables and transmission lines, and onshore services and support facilities. The existing U.S. legislation relevant to OTEC activities both during its research and development phase and during the commercial phase includes the OCS Lands Act,[222] CZMA,[223] DPA,[224] and the National Environmental Policy Act of 1969 (NEPA).[225] Except for NEPA, the pertinent provisions of these statutes have already been examined in the preceding sections on jurisdiction[226] and regulatory mechansims.[227] Consequently, the discussion here will be confined to NEPA and recent developments regarding the other statutes.

NEPA requires Federal agencies to prepare records on environmental effects of and alternatives to "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."[228] Since Federal involvement in OTEC development is expected to be substantial, at least during the initial stages, preparation of programmatic Environmental Impact Statements (EISs)[229] will be required during the research phase of OTEC development. Additionally, while OTEC facilities will be subject to site-specific EISs, because of Federal time, money, or effort an OTEC facility received,[230] it is possible that

222. 43 U.S.C. §§ 1331-43 (1970).

223. 16 U.S.C. §§ 1451-64 (1976).

224. 33 U.S.C. §§ 1501-24 (1976).

225. 42 U.S.C. §§ 4321-47 (1976).

226. *See* notes 92-141 *supra* and the accompanying text.

227. *See* notes 206-20 *supra* and the accompanying text.

228. 42 U.S.C. § 4332(c). *See generally* R. LIVOFF, A NATIONAL POLICY FOR THE ENVIRONMENT: NEPA AND ITS AFTERMATH (1976).

229. *See generally* Note, *The Scope of the Program EIS Requirement: The Need for a Coherent Judicial Approach*, 30 STAN. L. REV. 767 (1978).

230. Actions with direct effect as well as actions with indirect effects have been held subject to EIS requirements. Since Federal agencies are required to make a detailed statement on "major Federal actions significantly affecting the quality of the human environment," the question regarding the scope of "major Federal actions" assumes special importance. For a criticism of a broad interpretation of the term

regional EISs will also be needed, due to the cumulative effect of a number of OTEC facilities in a region.[231]

Among other significant developments, the Coast Guard, on December 4, 1978, proposed rules for administering an offshore oil pollution compensation fund,[232] which will be set up pursuant to the 1978 Outer Continental Shelf Lands Act Amendments,[233] which President Carter signed on September 22, 1978.[234] The Secretaries of Transportation and the Treasury will administer the fund, which is expected to cover "all marine oil pollution, including that discharged from onshore facilities and deepwater ports."[235] Under the 1978 amendments,[236] no license for the development and production of oil or gas on OCS will be granted unless it conforms with the requirements of CZMA.[237] Also, the Council on Environmental Quality (CEQ) is proposing new pollution clean up plans in which coastal States' interests are recognized.[238] It is also worth noting that since the total number of coastal zone management programs stands now at thirteen—California, Hawaii, Maine, Maryland, Massachusetts, Michigan, New Jersey, North Carolina, Puerto Rico, Oregon, Rhode Island, Washington, and Wisconsin[239]—more active State participation in decisionmaking can be anticipated.

2. *International Aspects*

In addition to the primary concern of the coastal state with its immediate marine environment, its interests also extend to the protection and preservation of a shared global marine environment. The latter is affected by unilateral state actions as well as collective actions by states. Selected recent developments of states' actions that might have a bearing on OTEC

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thereby requiring EISs for actions which may not be "major Federal actions," see Friedman, *The National Environmental Policy Act of 1969 - The Brave New World of Environmental Legislation*, 6 NAT. RESOURCES L. 44 (1973).

231. For a discussion of regional EISs, see Kleppe v. Sierra Club, 427 U.S. 390 (1976) *rev'g* Sierra Club v. Morton, 514 F. 2d 856 (D.C. Cir. 1975).

232. 43 Fed. Reg. 56840 (1978). *See* 9 ENVIRON. REP. (BNA) 1413 (1978).

233. Pub. L. No. 95-372, 92 Stat. 629 (1978).

234. *See* 9 ENVIRON. REP. (BNA) 972 (1978).

235. 43 Fed. Reg. 56,840 (1978).

236. *Supra* note 230.

237. 16 U.S.C. §§ 1451-64 (1976).

238. *See* 9 ENVIRON. REP. (BNA) 1416-17 (1978).

239. *Id.* at 1293.

development will be noted in this section, which will conclude with a brief comment on pertinent ICNT provisions.

a. *Unilateral U.S. Actions Related to the Marine Environment*

During the recent past, the U.S. Congress has adopted legislation with potential extraterritorial reach in the marine environment. For example, the Clean Water Act[240] extended the application of Section 311 (Oil and Hazardous Substance Liability) of the Federal Water Pollution Control Act[241] to cover activities which affect the resources of the 200-mile U.S. fisheries zone or its OCS. Earlier, the Fishery Conservation and Management Act of 1976[242] extended the U.S. fishery zone to 200 miles. Other U.S. acts with potential effect on maritime activities include the U.S. Ports and Waterway Safety Program,[243] the Marine Protection, Research and Sanctuaries Act of 1972,[244] the new Coast Guard Regulations concerning navigational aids,[245] and the DPA.[246]

The debate continues as to whether NEPA applies to major Federal actions abroad.[247] The argument for its application abroad was recently made at a Senate Subcommittee hearing by Russell E. Train, former EPA administrator, former CEQ chairman, and current president of the World Wildlife Fund. He asserted that House and Senate members attending a 1968 coloquium, which "served as a basis for NEPA," intended that the law apply beyond U.S. territorial limits, and that President Carter reinforced that view in his 1977 environmental message.[248] He added that an environmental policy which "failed to recognize the global nature of the human environment would be shortsighted," and that the U.S. should con-

240. Pub. L. No. 95-217, 91 Stat. 1566, 1593-96 (1977).

241. 33 U.S.C. § 1321 (1976).

242. Pub. L. No. 94-265, 90 Stat. 331 (1976).

243. 33 U.S.C. §§ 1221-27 (1976).

244. 16 U.S.C. §§ 1401-34 (1976).

245. *See, e.g.*, 42 Fed. Reg. 5964, 5966 (1977).

246. 33 U.S.C. §§ 1501-24 (1976).

247. *See generally* Comment, *Renewed Controversy Over the International Reach of NEPA*, 7 ENVT'L L. REP. 10,205 (1977); Sierra Club v. A.E.C., 4 *id.* at 20,685 (D.D.C. 1974); Environmental Defense Fund, Inc. v. U.S. Agency for International Development, 6 *id.* at 20,121 (D.D.C. 1975); Sierra Club v. Coleman, 405 F. Supp. 53 (D.D.C. 1975), *injunction continued*, 421 F. Supp. 63 (D.D.C. 1976); COUNCIL ON ENVIRONMENTAL QUALITY ENVIRONMENTAL QUALITY — EIGHTH ANNUAL REPORT Appendix G 395 (1977).

248. *See* 9 ENVIRON. REP. (BNA) 304 (1978).

sider the "significant extra-territorial environmental impacts" of its actions.[249] However, with regard to the application of NEPA to the Export-Import Bank (Eximbank), the concern of U.S. business is that EIS requirements for Eximbank would result in delays in getting loans and added costs to applicants, thereby depressing the rate of U.S. exports.[250]

The controversy will be settled through an Executive Order setting out responsibilities of Federal agencies for reviewing environmental effects of their overseas projects. Reportedly, under a proposed Executive Order, certain Federal actions having a significant adverse effect upon the environment of nonparticipating third countries or natural resources of global importance will be required to have abbreviated environmental reviews.[251] Eximbank President, John L. Moore, recently explained that the proposed Executive Order would require short environmental assessments primarily for "projects" to be financed by Eximbank.[252] Thus, if Eximbank were to finance the purchase of an OTEC plant for a developing state, an assessment would be required. It may also be noted that the Department of Energy has commissioned environmental impact assessments of a small floating OTEC test facility.[253]

Since so little is yet known about OTEC activities and operations, environmental assessments should be conducted during the research phase. The same applies in the commercial phase, whether the OTEC plant is to operate in a U.S. coastal zone, in the coastal zone of another state, or on the high seas.

b. *Multilateral Actions*

The 1972 U.N. Conference on the Human Environment in Stockholm[254] acknowledged the emerging norms of state responsibility and liability for transnational environmental damage. Under Principle 21 of the U.N. Declaration on the Human Environment, states are responsible for insuring "that activities within their jurisdiction or control do not cause damage to

249. *Id.*

250. *Id.* at 305.

251. *Id.* at 1049.

252. *Id.*

253. Noted in Stein, *Environmental Aspects of OTEC Development and Demonstration*, in ASIL STUDY, *supra* note 70, at 154.

254. *See Report of the U.N. Conference on the Human Environment*, U.N. Doc. A/CONF.48/14/Rev. 1 (1972).

the environment of other States or of areas beyond the limits of national jurisdiction."[255] Also, under Principle 22, "States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction."[256] Principle 7 calls upon states to "take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage or to interfere with other legitimate uses of the sea."[257]

Following the Stockholm conference, several conventions were concluded, including the London Convention on the Dumping of Wastes at Sea,[258] the 1973 IMCO Convention on the Prevention of Pollution from Ships,[259] and the 1974 Convention on the Safety of Life at Sea.[260] Also, there have been substantial bilateral and multilateral efforts to conclude new conventions for the prevention of marine pollution and the conservation and management of the marine environment[261] which might have some bearing on OTEC[261] operations.

c. *ICNT Provisions*

Part XII of ICNT contains 46 Articles dealing with the protection and preservation of the marine environment. States are obligated to protect and preserve the marine environment,[262] to refrain from polluting the environment of other states or areas beyond their national jurisdiction,[263] and to take measures to prevent, reduce, and control marine pollution.[264] Among specific measures, states are to minimize the release of toxic, harmful or noxious substances from dumping,[265] and pol-

255. *Id.* at 5.

256. *Id.*

257. *Id.* at 4.

258. *Supra* note 153.

259. *Supra* note 156.

260. *Reprinted in* 14 INT'L LEGAL MATERIALS 959 (1975).

261. In addition to note 168 *supra, see generally* 4 NEW DIRECTIONS IN THE LAW OF THE SEA, *supra note* 10, at 331-518; 6 *id.* at 456-562; Hickery, Jr., *Custom and Land-Based Pollution of the High Seas,* 15 SAN DIEGO L. REV. 409, 445-54 (1978); Okidi, note 167 *supra.*

262. ICNT art. 193.

263. See *id.* arts. 195(2), 238.

264. *Id.* art. 195(1).

265. *Id.* art. 195(3)(a)(iii).

lution from vessels[266] and "from all other installations and devices operating in the marine environment, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices."[267] In another article ICNT calls upon states "[i]n taking measures to prevent, reduce and control pollution of the marine environment . . . not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another."[268] States are also to assume positive legal responsibility to cooperate in international monitoring programs,[269] and to assess the environmental impacts of their activities on the marine environment.[270] Article 210 deals specifically with activities in the Area:

> 1. International rules, standards and recommended practices and procedures shall be established . . . to prevent, reduce and control pollution to the marine environment from activities relating to the exploration and exploitation of the Area. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.
>
> 2. . . . States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment from activites relating to the exploration and exploitation of the Area undertaken by vessels, installations, structures and other devices flying their flag or of their registry.

According to Article 236 on responsibility and liability, states are "responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment [and] shall be liable in accordance with international law for damage attributable to them resulting from violations of these obligations."[271]

This chapter on the ocean's environment provides stronger guarantees than ever before.[272] OTEC activities and operations would certainly be covered under many of the principles and specific provisions contained in the chapter.

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266. *Id.* art. 195(3)(b).
267. *Id.* art. 195(3)(d).
268. *Id.* art. 196.
269. *Id.* art. 205.
270. *Id.* art. 207.
271. *Id.* art. 236(1).
272. For a critical appraisal of ICNT provisions on the marine environment, see Schneider, *Something Old, Something New: Some Thoughts on Grotius and the Marine Environment*, 18 VA. J. INT'L L. 147 (1977).

III. CONCLUSIONS

Since OTEC holds sufficient promise to warrant vigorous research efforts on its systems and technology,[273] it is equally important that an efficient and effective legal and institutional framework be devised without any further delay. It is for this reason that a major objective of this study has been to focus on some of the most pressing aspects related to OTEC development. Accordingly, the preceding discussion addressed only selected issues and either left untouched or barely touched upon several issues, including the potential application of antitrust laws to OTEC activities,[274] liability plans,[275] utility policy and regulation,[276] and financial arrangements and incentives including tax advantages[277] which might facilitate and expedite OTEC development.

Specific recommendations made here relate to both Federal-State and international aspects. To recapitulate, a comprehensive ocean management system for U.S. coastal areas is recommended, which requires comprehensive ocean management legislation. In the international arena, it may not be too early to consider the drafting of a convention which mandates environmental impact assessments of a state's major projects which could harm the environment of another state or the shared global environment, and provides for consultative mechanisms.[278] This should be followed by the drafting of an-

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273. *See* section I *supra*.

274. OTEC operations might have implications for antitrust laws, for the large investment needed for the construction, purchase or operations of an OTEC plant might require the involvement of several firms and/or states. Similarly, a joint venture may be an attractive vehicle to market OTEC technology and/or OTEC energy. For a discussion of some of the issues raised by joint arrangement for developing new technology or producing new products, see Baker, *Antitrust as a Spur to Technical Progress*, 23 AM. U. L. REV. 547 (1974).

275. *See generally* Faron, *supra* note 165, at 107-11; Nyhart, *Problems of Legal Responsibility and Liability to Be Anticipated in OTEC Operations*, in KNIGHT, NYHART & STEIN, *supra* note 9, at 129-64.

276. It is proposed that the Federal Energy Regulatory Commission, as the lead Federal Agency, assume responsibility for formulating and implementing the needed "utility policy" regarding OTEC.

277. *See generally* sources cited in note 205 *supra*; B. WASHOM & J. NILLES, *supra* note 9.

278. A Senate Resolution, S.49, was introduced in 1978 urging the United States "to negotiate an international treaty requiring environmental impact assessments on major projects that could harm the environment of another nation or the global commons. International impact statements could be filed with the . . . (UNEP)." The

other convention specifically dealing with OTEC activities as well as a code of conduct. Even if these tasks appear to be overwhelming, it is imperative that they be undertaken now.

Resolution would require states parties to the treaty to "consult with affected nations, or with the UNEP in cases involving global commons, to minimize harmful impacts across international boundaries." 9 ENVIRON. REP. (BNA) 539 (1978).

ASPECTS OF DEPARTMENT OF ENERGY INTERNATIONAL LEGAL PROGRAMS[1]

Introduction

ROBERT C. GOODWIN, JR.*

The articles that follow represent a sampling of the legal issues dealt with by the attorneys who work under me at the Department of Energy (DOE). Although these issues may appear to have little in common, they are, in fact, parts of a fascinating collection of interconnected international and emergency preparedness legal problems in the energy area. The issues related to information systems on the international oil market, for example, touch both on one of the major DOE regulatory programs, the transfer pricing program, and on the International Energy Agency (IEA). The latter deserves special mention since implementation of its emergency programs has been the focus of considerable U.S. Government legal effort.

The agreement on an International Energy Program (IEP),[2] entered into by most of the free world's major energy consuming countries, established the International Energy Agency, as well as a number of specific goals and programs. The most significant of these was an emergency oil sharing arrangement to be implemented in case of a cutoff or serious reduction in oil supplies available to the IEA group of countries. The recent difficulties in Iran, although not of a magnitude to trigger IEA action to date, have served as a reminder

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1. The views expressed herein are those of the authors and should in no way be taken as representing the views of the U.S. Department of Energy.

2. Done at Paris, Nov. 18, 1974, T.I.A.S. No. 8278, 27 U.S.T. 1685.

that the purpose of the IEP is not simply to deal with politically motivated embargoes, but rather to address supply disruptions from any cause.

One of the difficult issues faced regarding the implementation of an emergency sharing system, was how to utilize the assistance and expertise of international oil companies without exposing them to antitrust risks. The solution, with respect to the U.S. companies involved, was, in the first instance, the formation of a Voluntary Agreement among those companies under the provisions of section 708 of the Defense Production Act, which provided antitrust immunity so long as the procedures of the statute and Agreement were followed. The first Voluntary Agreement, which set out the permissible range of U.S. company activities in implementing the IEP, was approved by the Attorney General on March 28, 1975. In December of that year, Congress passed the Energy Policy and Conservation Act, which contains provisions on voluntary agreements to carry out the IEP. A new Voluntary Agreement was entered into pursuant to this authority and remains in effect.

While one of the principal legal problems in regard to the implementation of the international emergency preparedness programs has been in the antitrust area, implementation of domestic emergency preparedness programs has involved considerably more technical legal issues. Specifically, the Strategic Petroleum Reserve Program has involved real estate acquisition questions, and general procurement and contract law issues.

As the above discussion indicates, the sampling that follows is truly that—a sampling. While this collection of articles may only provide a glance at international energy issues, we hope that the reader will find the view interesting and informative.

International and Domestic Information Systems On the International Oil Market

REINIER H.J.H. LOCK*

INTRODUCTION

The 1973 world oil crisis, generated largely by the OAPEC oil embargo, raised anew the question of what role the United States government should play in the international oil market. This question has concerned U.S. policymakers ever since the large scale entry of U.S. companies into the international oil market in the late 1920's.[1] Perhaps the most concerted effort to assert a U.S. government presence took place during World War II, when Harold Ickes, then Secretary of the Interior, led unsuccessful efforts to purchase major Arabian oil concessions from U.S. companies for a government "Petroleum Reserve Corporation" and to build a government-owned trans-Arabia pipeline.[2]

Despite this concern, the U.S. based oil companies have conducted their international dealings in virtually a political vacuum. The government has had little knowledge of, let alone control over, their international negotiations and operations. They have appeared to conduct diplomacy and "foreign policy" almost as independent states, except at certain, often critical times, when they actively sought government support for their international initiatives. Consultation with the government, when it did take place, was often initiated by the companies, very much on their terms, and it seldom allowed the government time to act independently.

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1. *See generally* SAMPSON, THE SEVEN SISTERS, Ch. 4 (1975); BLAIR, THE CONTROL OF OIL, 31 *et. seq.* (1976).

2. SAMPSON, *supra* note 1, at 94-99.

The 1973 crisis revealed that inadequate information would probably have rendered most government initiatives ineffective, even if it had desired or possessed the legal mechanisms to assert its presence or influence more directly into the negotiations between U.S. oil companies and the OPEC producing countries.

The critical need for an adequate, intelligent, governmental decisionmaking information base, irrespective of whether the government should play a greater role in, or seek to regulate, U.S. oil companies' foreign activities, had become obvious on both the domestic and international levels. In November 1974, most major Western industrialized nations (and Japan) concluded, under the auspices of the OECD, the Agreement on the International Energy Program (IEP Agreement)[3] in an effort to counter the new assertion of concerted power by OPEC.

THE IEP AGREEMENT INFORMATION SYSTEM

The IEP Agreement called for, *inter alia*, "a more active role in relation to the oil industry by establishing a comprehensive international information system and permanent framework for consultation with oil companies."[4] The Agreement established a two-part Information System:[5] a "General Section on the situation in the international oil market and activities of oil companies;" and the "Special Section" which is to ensure efficient operation of the emergency preparedness measures which comprise a substantial portion of the treaty.[6] Both sections are coordinated through the Secretariat of the International Energy Agency (IEA), the organization created by the OECD in November 1974 to implement the Agreement's provisions. Policy under the Agreement is developed by "standing groups," consisting of representatives of nation signatories in certain functional areas. The Standing Group on the Oil Market (SOM) is the primary functionary for the General Section.

Under the General Section, participating countries are required to report, on a regular basis, "precise data" identified by SOM and approved by the IEA's Management Committee,[7]

3. Agreement on an International Energy Program, done at Paris, November 18, 1974, T.I.A.S. No. 8278, 27 U.S.T. 1685 [hereinafter cited as IEP Agreement].

4. IEP Agreement, Preamble.

5. *Id.* art. 25.

6. An interesting critical analysis of the IEP Agreement, in particular its emergency preparedness provisions, is contained in Willrich and Conant, *The International Energy Agency: An Interpretation and Assessment*, 71 AM. J. INT'L L. 199 (1977).

7. IEP Agreement, art. 29.

on specific subjects relating to oil companies operating within their jurisdiction. These subjects include corporate and financial structure, crude oil production rates, stocks, acquisition costs and prices, allocation of crude oil supplies, terms of access to supplies, and capital investments.[8] Most of this data is obtained by the governments from their oil companies. The identification of data required is an ongoing SOM function which is still in relatively early development.[9] In pursuance of this function, SOM is required to consult with companies to make certain that the system is "compatible with industry operations" and to develop standards and procedures to harmonize data reporting and ensure its confidentiality.[10]

The data reported is used by both the IEA and participating countries to assist their national energy planning. However, much of the data reported is treated confidentially by the IEA and in a form that will avoid disclosures of "proprietary"[11] company information or information that might impair competition within the oil industry.[12] Elaborate procedures have been adopted to avoid disclosure of proprietary company-specific data. Most of the data is transferred to the IEA in aggregate, noncompany-specific form: most of the data received from the IEA by the U.S. government is classified as national security sensitive.[13] Only certain types of data are obtained through systematic reporting. For other types, such as terms of access to crude supplies, company supply and demand appraisals, industry structure, and exploration prospects, SOM has developed a system of regular, formal consultations with individual oil companies.

Both the General Information System and the emergency

8. *Id.* art. 27. The list is not exhaustive, and it may be expanded by the IEA's Governing Board. *Id.* art. 27(1)(j).

9. *Id.* art. 31.

10. *Id.* art. 30.

11. The term is construed quite narrowly in article 28 as being limited to such matters as patents, trademarks, scientific processes, geological data, individual sales, and tax returns.

12. Article 27(3) requires that participating countries report "on a nonproprietary basis" and in a way that will "not prejudice competition" or undermine its laws protecting competition.

13. To meet current classification standards, the data must be such that its unauthorized disclosure could cause identifiable damage to the national security. Exec. Order No. 12,065, 43 Fed. Reg. 28,957 (1978). Most information received from IEA could be classified as "foreign government information" which, under § 1-303 of Exec. Order No. 12,065, is presumed to cause such identifiable damage.

preparedness activities under the IEP Agreement rely heavily on oil company cooperation for their successful implementation. Although almost as an afterthought in the IEP Agreement, the General Section information system and its mechanisms for consultations with companies may, ironically, prove to be one of the more solid achievements of the Agreement.

The IEA has already developed reporting systems on the prices and acquisition costs of crude oil imports. It also receives data on stocks and production. Generally, reporting as to crude prices and acquisition costs has been confined to OPEC "crude streams," defined by oil gravity and country and usually coincident with supplier countries. Theoretically, however, Article 27 is broad enough to authorize reporting on any crude stream. The role of SOM and other IEA organs in developing these reporting systems could make them important instruments of IEA policy.

U.S. GOVERNMENT REPORTING SYSTEMS

To meet the information shortcomings exposed by the 1973 crisis as well as the more specific requirements of the IEP Information System, DOE and its predecessor FEA, have developed a group of extensive reporting systems by U.S. based oil companies on their international crude oil dealings. When suitably linked, these reports should provide DOE with the ongoing, comprehensive information base necessary for meaningful analysis of the state and direction of the international oil market essential for effective policy formulation. They also will contribute to fulfillment of IEA obligations and certain domestic statutory and regulatory requirements.

Two existing reporting systems, the Foreign Crude Oil Cost Report,[14] and the Transfer Pricing Report,[15] will soon be significantly augmented by a third system, the Foreign Oil Supply Agreement Report (FOSA).

The Foreign Crude Oil Cost Report (EIA-67) contains data on the cost of foreign crude oil acquisitions by U.S. based companies and on the volume of exports from producing countries to the United States. The information on crude oil costs is provided to the IEA under Article 27 of the IEP Agreement. The obligation is imposed upon firms who acquire 100,000 bar-

14. DOE Form EIA-67 (formerly FEA-P-328-Q-O).

15. DOE Form ERA-51 (formerly FEA-F-701-M-O).

rels or more of crude oil per day from countries who are not IEA members. Reporting is geared to the IEA's classification of crude streams. Reports on a contract-by-contract basis can be readily linked with the contract details provided by FOSA reports.

The FOSA Report (form EIA-27) should provide the most significant information about foreign oil operations. Reporting is imposed on any U.S. entity which has a right to lift for export certain volumes[16] of crude oil in foreign countries.[17] These entities are required to report all material terms of their contracts or agreements with foreign producer governments or entities controlled by them, such as national oil companies. Certain specified details are also required: prices, fees for services, other payments to the host government, minimum and maximum lifting rights, and government imposed production limits.[18] Contracts and other related documents must be produced if required by DOE.[19] In addition, companies are required to notify DOE of negotiations with producer governments which might "reasonably lead to the establishment of any supply arrangement" covered in section 215.3.[20] DOE can obtain further details through consultation with the reporting company. Hence, some potential for an early warning system on impending negotiations is built into the FOSA regulations.

Many comments on the proposed regulation received from potentially affected oil companies argued against a reporting requirement and urged, instead, a continuation and augmentation of the voluntary consultations that had taken place periodically with the government. DOE concluded that such consultations would not ensure the systematic, current, and ongoing information base necessary for well-informed policy formulation and timely decisions in the international oil supply area. However, DOE is encouraging continuation of the voluntary consultation process to facilitate its understanding of the international oil situation and sharpen the perceptions of both the companies and the government.

16. 150,000 barrels per day average for a year, or a total of 55 million barrels in less than a year, or a total of 150 million barrels over the lifetime of the agreement.

17. Final rulemaking entitled Collection of Foreign Oil Supply Agreement Information, 10 C.F.R. § 215 (1978).

18. 10 C.F.R. § 215.3 (1978).

19. 10 C.F.R. § 215.4 (1978).

20. 10 C.F.R. § 215.6 (1978).

The central concern of most potentially affected (respondent) companies has been the protection of confidential information reported under the FOSA system. A significant portion of the data reported will probably be either "proprietary" or national security sensitive, or both. One approach to ensure confidentiality would be for DOE to classify such data as meets the standards for national security classification under Executive Order 12,065. This order limits access to persons within the government to the classified information who are deemed "trustworthy," *i.e.*, possessing the requisite security clearance, and who can establish that "access is necessary for the performance of official duties."[21]

Access within the government to "proprietary" information, that is, information regarded as confidential for essentially commercial-competitive reasons, could, under current law, be limited to those persons who require such access to fulfill their official duties.

Access may be denied to the public at large under section 552(b)(4) of the Freedom of Information Act, which exempts "trade secrets and commercial or financial information obtained from a person and privileged or confidential" from the Act's coverage.[22]

To enhance these protections given to FOSA, DOE will impose carefully controlled limitations on access within the government to, and detailed procedures for the handling of, FOSA information classified under Executive Order 12,065, or information which is determined to be "proprietary."[23]

The Transfer Pricing Report form (ERA-51) is designed to collect information on transfer prices, those assigned to imported oil between U.S. companies and their foreign trading affiliates, and on crude oil transactions between nonaffiliated entities. This information is required to administer adequately the application to refiners of DOE's Mandatory Petroleum

21. Section 4-101 of Exec. Order No. 12,065, 43 Fed. Reg. 28,957 (1978). Access may be denied to the public at large under § 552(b)(1) of the Freedom of Information Act, which exempts matters properly "kept secret in the interest of national defense or foreign policy" under criteria established by an Executive order. 5 U.S.C. § 552(b)(1) (1976).

22. 5 U.S.C. § 552(b)(4) (1976).

23. An indication of the kinds of procedures that will be adopted with respect to proprietary information under the Freedom of Information Act is included in a recent Notice of Proposed Rulemaking with respect to DOE's proposed FOI regulations. 43 Fed. Reg. 40,530, at 40,536.

Price Regulations. These requirements impose price ceilings on certain petroleum products based on crude oil costs.[24] Transfer pricing information also is provided to the IEA under the IEP Agreement.

The obligation to report is imposed on a monthly basis upon refiners importing at least 500,000 barrels of crude, or any crude from a foreign affiliate in that month. Although ERA-51 is limited to refiners, it does provide data similar to that gathered under EIA-67 and the FOSA system but from a somewhat different perspective. This report, therefore, helps DOE monitor certain cost and price movements, both within the United States and internationally, and enhances DOE's analytical capabilities.

Between the essentially interlocking EIA-67 and FOSA systems, and the additional information provided by ERA-51, a substantial data base can be provided. It can be supplemented further, if necessary, by the monthly *Report of Oil Imports into the U.S. and Puerto Rico* designed primarily to facilitate implementation of the Oil Imports Program.[25] The obligation to report details, such as volume and port of entry, are imposed on oil companies which import crude oil, residual fuel oil, or finished petroleum products.

The legal authority for imposition of all three major sets of reporting requirements described above lies in section 13(b) of the Federal Energy Administration Act (FEAA), as amended:

> All persons owning or operating facilities or business premises who are engaged in any phase of energy supply or major energy consumption shall make available to the Administrator such information and periodic reports, records, documents, and other data, relating to the purposes of this chapter, including full identification of all data and projections as to source, time and methodology of development, as the Administrator may prescribe by regulation or order as necessary or appropriate for the proper exercise of functions under this chapter.[26]

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24. Mandatory Petroleum Price Regulations, 10 C.F.R. § 212 (1978). Section 212.84 prescribes standards for establishing the cost of crude oil imports in transactions between affiliated entities. Basically, an effort is made to emulate the price such entities would charge if they were dealing at arm's-length, § 212.84(c). DOE establishes representative arm's-length prices, compares these with the companies' reported transfer prices, and disallows crude costs attributable to excessive transfer prices.

25. DOE Form ERA-60 (formerly FEA-P113-M-O) [1977] 3 EN. MNGM'T (CCH) ¶ 18,413, which in 1977 consolidated and replaced three earlier reporting forms. *See* 42 Fed. Reg. 4,889 (1977) for the announcement of the availability of this form.

26. 11 U.S.C. § 772(b) (1976). The data gathering authority is now vested in the

All three reporting systems patently meet the requirements that they relate to the broad purposes of the FEAA and that they are "necessary or appropriate" to the exercise of the Secretary's functions thereunder. For instance, the Secretary's general functions in the execution of his authority under section 5(b) include the collection and analysis of information on energy demand, production, and reserves, the development of a comprehensive energy policy and energy trade policies, integrating domestic and foreign energy supply policies, promoting stability in energy prices, and developing plans and programs for dealing with energy production shortages.[27] Furthermore, quite specific authority for much of the information sought lies in section 15 of the FEAA, which imposes on DOE the requirement to report annually in considerable detail on specified energy matters to Congress and the President.[28]

Detailed information on the financial performance of all U.S. based energy companies will be obtained from the energy company financial report system (FRS) (DOE Form EIA-28), authorized by section 13(b) of the FEAA and specifically mandated by section 205(h) of the Department of Energy Organization Act.[29] These provisions require, *inter alia,* that the FRS yield information on energy company operations segregated "by energy source and geographic area."[30] Under this mandate, DOE will collect data to compare foreign and domestic financial performance, sources and uses of cash, investments, relative performance, revenue, cost and profit differences, and investment in major foreign regions. Apart from specific international data, the FRS will yield a wide variety of detailed information in areas such as competition and energy supply and development. This information could provide an important complement to the other information systems discussed. Together they should soon provide a relatively comprehensive information base, especially if effectively linked with the IEA system, for informed decisionmaking.

Administrator of the Energy Information Administration of DOE by virtue of section 205(c) of the Department of Energy Organization Act. 42 U.S.C.A. § 7,135(c)(Supp. 1977). The functions of the former Administrator of the FEA are now vested in the Secretary of DOE by virtue of section 301(a) of this act. 42 U.S.C.A. § 7,151(a)(Supp. 1977).

27. 15 U.S.C. § 764(b)(1976).

28. 15 U.S.C. § 774 (1976).

29. 42 U.S.C.A. § 7,135(h)(Supp. 1977).

30. 42 U.S.C.A. § 7,135(h)(2)(C)(Supp. 1977).

Regulation of U.S. Oil Imports

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INTRODUCTION

The importation of oil[1] into the United States is regulated by the Department of Energy (DOE) through the Mandatory Oil Import Program (MOIP). The MOIP was created in March 1959 by Presidential Proclamation 3279 and has undergone substantial modifications in the intervening years.[2] The purpose of the MOIP is to reduce the threat to the national security posed by the dependence by the U.S. on foreign sources of oil, which are subject to the threat of interruption, and to foster the development of domestic energy sources and refining capacity.[3]

Proclamation 3279 was issued pursuant to the authority now embodied in section 232 of the Trade Expansion Act of 1962, as amended by the Trade Act of 1974.[4] Section 232(b) provides that, upon an investigation and finding by the Secretary of the Treasury that a commodity is entering the country "in such quantities or under such circumstances as to threaten to impair the national security," the President "shall take such action, and for such time, as he deems necessary to adjust the imports of . . . [the] article and its derivatives so that . . . imports [of the article] will not threaten to impair the national security."[5] Such an investigation and finding with re-

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1. In this article "oil" is defined to include crude oil and partially refined and finished products, whether derived from crude oil, coal, or natural gas. Presidential Proclamation 3279, as amended, encompasses all of these materials under the term "crude oil, unfinished oils and finished products," each of which is further defined in the Proclamation.

2. Pres. Proc. No. 3279, 3 C.F.R. 11 (1959-1963 Compilation), *reprinted in* 19 U.S.C. § 1862, at 542 (1976).

3. *Id.*

4. 19 U.S.C. § 1862 (1976) (corresponds to Trade Expansion Act of 1962, Pub. L. No. 87-794, § 232, 76 Stat. 437, *as amended by* Trade Act of 1974, Pub. L. No. 93-618, § 127(d), 88 Stat. 1993).

5. *Id.* § 1862(b).

spect to "petroleum and petroleum products" was made in 1959 and formed the basis for the quota/allocation system established by Presidential Proclamation 3279.[6] In 1975, another national security investigation was conducted and the findings which resulted therefrom were incorporated with the prior findings in Presidential Proclamation 4341, which imposed the supplemental import fee.[6.1]

SCOPE OF THE SECTION 232 AUTHORITY

Section 232 of the Trade Expansion Act authorizes the President to take "such action . . . as he deems necessary" to adjust imports.[7] The authority was broadly construed by the Supreme Court in *FEA v. Algonquin SNG, Inc.*, which upheld the President's authority to impose license fees.[8] Throughout the decision, the Court cited with approval those portions of the legislative history which would support the widest possible interpretation of the President's authority, such as Senator Millikin's statement that it included the authority "to take whatever action he deems necessary to adjust imports . . . [including use of] tariffs, quotas, import taxes or other methods of import restrictions."[9] Although the Court in *Algonquin* did not explicitly address the question of the legality of the previous quota system, it may be assumed to have been upheld, *sub silentio,* since the question presented was whether the President's authority extended beyond the imposition of quantitative controls.

Although the authority to impose quotas under section 232 of the Trade Expansion Act is not susceptible to serious legal

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6. Pres. Proc. No. 3279, *supra* note 2.

The Executive Branch has consistently taken the position that the continuing validity of a national security investigation and finding provides a basis for subsequent amendments to the original action without the necessity of additional investigations being conducted. In this respect, numerous modifications to the original MOIP have been implemented, including the substitution of a system of license fees for the quota/allocation system in 1973, without conducting additional national security investigations. Pres. Proc. No. 4210, 11 C.F.R. 239 (1971-1975 Compilation). The Attorney General also concluded in a formal opinion issued in 1975 that, although permissible if desired, no additional national security investigation was legally required in order for President Ford to impose supplemental fees on oil imports despite the changes in world oil markets occurring after the OPEC oil embargo. 43 OP. ATT'Y GEN. 3 (1975).

6.1 40 Fed. Reg. 3965 (1975).

7. 19 U.S.C. § 1862(b) (1976).

8. FEA v. Algonquin SNG, Inc., 426 U.S. 548, 561-71 (1975).

9. *Id.* at 564.

question, a possible legal issue exists as to whether an auction of the quota tickets, or some other form of allocation, is within the authority of the President. However, any grant of executive power carries an implicit authority to implement that power, and a quota or other form of quantitative restriction cannot be implemented without a concomitant mechanism for the distribution of the limited quantities which are allowed to be imported.[10] Under the quota system established in 1959, the mechanism chosen was an allocation to refiners and importers based on amounts they historically imported; however, there is nothing in the legislative history which would dictate such a result or which would preclude some other distribution mechanism, such as an auction, from being adopted.[11] Considering that allocations based on historical volumes have several deleterious effects, including their inherent anticompetitive nature and the enforcement difficulties they pose, there are excellent policy reasons for the adoption of a distribution mechanism other than an allocation system. As a consequence, an auction of import rights would most likely be viewed as within the realm of necessary action required to be exercised as part of the authority conferred.

HISTORY OF THE MOIP

As previously noted, the MOIP was created in March 1959 by Proclamation 3279. It replaced a system of voluntary controls that had failed to prevent oil imports from increasing. At that time, such imports were approximately half the price of domestic crude oil.[12] Initially, quota levels were established for different products and regions of the country in accordance with then current levels of imports. Allocations of crude oil import licenses were granted to all refiners, regardless of whether or not they actually imported crude oil.[13] This system ensured that the value of quota licenses was evenly distributed and not received solely by coastal refiners, which would have given them a large competitive advantage. Allocations of petroleum products, such as residual fuel oil, were granted to certain classes of importers.

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10. *Id.* at 559.

11. *See generally* 101 CONG. REC. 5298 (1955) (remarks of Sen. Barkley); 101 CONG. REC. 5588 (1955).

12. *See generally* Pres. Proc. No. 3279, *supra* note 2.

13. Inland refiners realized the value of the licenses by arranging exchanges of oil with actual importers.

The effectiveness of the quota in limiting imports ultimately proved to be its downfall. Reduced imports resulted in greater demand for domestic production; however, once excess capacity was utilized, additional demand induced inflationary impacts.[14] As a consequence, political pressure grew to alter the system either to include additional persons seeking to share in the growing monetary value of the import licenses or to increase quota levels and thereby lower the indirect, and increasingly controversial, subsidy to the domestic petroleum industry.

The controversy which quotas engendered led to the decision in April 1973 to issue Presidential Proclamation 4210, which provided for the gradual replacement of quotas by a system of licenses subject to fees which would be available to all importers.[15] The Proclamation established a fee of $0.21 per barrel for crude oil and $0.63 per barrel for petroleum products.[16] The difference between the two fees, $0.42, became the effective per barrel level of protection for domestic refining capacity. Newly constructed refining capacity also was granted a five-year exemption from the fee on 75% of inputs, which meant that such capacity would have a total level of protection equaling $0.57¾ per barrel.[17] Existing quota levels were continued in the form of fee-exempt licenses but were subject to being decreased annually by a specified amount until their complete elimination in 1980.[18] However, the quota levels for certain products (*e.g.*, residual fuel oil imported into the east coast) had previously been set at such high levels that only a relatively small amount of such imports are currently subject to the fee.[19]

In January 1975, President Ford imposed a supplemental fee on all imports based on the failure of Congress to pass legislation in response to the energy crisis in the aftermath which followed the 1973-74 oil embargo. Presidential Proclamation 4341 provided for an initial supplemental fee of $1.00 per barrel, which was to be increased in $1.00 increments to a maximum of $3.00 per barrel.[20] The passage of the Energy Pol-

14. SPECIAL COMMITTEE TO INVESTIGATE CRUDE OIL IMPORTS, REPORT (Mar. 6, 1959).
15. Pres. Proc. No. 4210, 3 C.F.R. 239 (1971-1975 Compilation).
16. *Id.* at 243.
17. *Id.* at 245.
18. *Id.* at 248-49.
19. *See* Pres. Proc. No. 3389, 3 C.F.R. 108 (1959-1963 Compilation).
20. Pres. Proc. No. 4341, 3 C.F.R. 431, 433 (1971-1975 Compilation).

icy and Conservation Act[21] in December of 1975 allowed the President to rescind the supplemental fee in Presidential Proclamation 4412 at a time when it had only reached $2.00 per barrel.[22] Since that time, there have been no substantial modifications to the MOIP.

REGULATORY DEVELOPMENT

Part 213 of Title 10 of the Code of Federal Regulations contains the regulations governing the MOIP. Under the regulations, fee-exempt licenses are annually allocated[23] within the overall levels specified to applicants based on their inputs during a base period.[24] The number of fee-exempt licenses for each product is specified by geographical regions.[25]

The Proclamation and the regulations also preserve certain exemptions for "long term allocations" granted in the 1960's to provide incentives for the construction of petrochemical facilities in Puerto Rico[26] and the Virgin Islands.[27] Persons holding long term allocations are not affected by the sliding scale reducing fee-exempt imports, nor by any other provision that could impair their rights.[28]

Persons not qualifying for a fee-exempt allocation, or who do not receive a sufficient allocation to cover the quantity of oil that they currently import, must apply for licenses subject to the $0.21 or $0.63 per barrel fee, as appropriate.[29]

Procedures for exceptions from Part 213 are contained in Part 205, Subpart D. These provisions implement the authority contained in section 5 of the Proclamation which provides that exceptions may be granted on various grounds, including where payment of the fees would represent an "exceptional hardship."[30] Appendix II of Subpart D contains guidelines given particular consideration in the disposition of exception re-

21. Energy Policy and Conservation Act, 89 Stat. 871 (codified in scattered sections of 15, 42, 50 U.S.C.).

22. 41 Fed. Reg. 1037 (1976).

23. Oil Import Regulations, 10 C.F.R. § 213.3 (1978).

24. *Id.* at 213.9-11.

25. *Id.* at 213.12.

26. Pres. Proc. No. 3693, 3 C.F.R. 153 (1964-1965 Compilation).

27. Pres. Proc. No. 3820, 3 C.F.R. 165 (1967-1970 Compilation).

28. Pres. Proc. No. 3279(9) as amended by Pres. Proc. No. 4210, 3 C.F.R. 11 (1959-1963 Compilation), *reprinted in* 19 U.S.C. § 1862, at 546 (1976).

29. Pres. Proc. No. 3279(3)(a)(1) as currently amended by Pres. Proc. No. 4210, *supra* at 543.

30. 10 C.F.R. § 205.50 (1978).

quests. The guidelines authorize exceptions where, for example, imposition of fees would lead to a result unintended by the Proclamation or would seriously impair the operations of profitability of the applicant's business.[31]

CURRENT EFFECTIVENESS OF THE PROGRAM

Since the adoption of the original program, the world oil market and its relationship to the U.S. oil market have changed fundamentally. The Arab oil embargo, the subsequent several-fold increase in foreign oil prices, and the price controls under the Emergency Petroleum Allocation Act of 1973 (EPAA), as amended,[32] have completely altered the economic positions of persons affected by the MOIP. When the license fee program was initiated in 1973, world crude oil prices were less than domestic prices and were expected to be roughly aligned in the future. Those events resulted in an oil market where a substantial portion of U.S. crude oil has been priced at levels well below world market prices[33] and arguably does not require the additional protection afforded by the MOIP.

Although the protection offered by the MOIP is currently overshadowed by the effects of domestic price controls, the MOIP remains the only long term vehicle for encouraging the construction of domestic refinery capacity and the protection of crude oil production. Therefore, once these controls expire, the MOIP will most likely play an increasingly important role in the regulation of U.S. oil imports.

OTHER STATUTORY AUTHORITIES WHICH COULD BE UTILIZED TO CONTROL OIL IMPORTS

There are several other statutory authorities under which the President could conceivably take action to control oil imports. Section 456 of the Energy Policy and Conservation Act (EPCA) provides that the President may implement a procedure by which "the United States may exercise the exclusive right to import and purchase all or any part of crude oil . . . and refined petroleum products of foreign origin for resale in the United States."[34] Implementation of this authority requires congressional approval as an Energy Action under section 551

31. *Id.* § 205.5, app. II.

32. Energy Petroleum Allocation Act, 15 U.S.C. §§ 751-56 (1976).

33. The value of lower-priced domestic crude oil is allocated to refiners under the Domestic Crude Oil Allocation ("Entitlements") Program. *See* Mandatory Petroleum Allocation Regulations, 10 C.F.R. § 211.67 (1978).

34. Energy Policy and Conservation Act § 456, 15 U.S.C. § 760b(a) (1976).

of EPCA.[35] Section 456 requires that the President buy and sell without profit or loss, except for individual cases which "result in progress toward a lower price for oil sold in international commerce."[36] In addition, the President must find that the use of such authority "is likely to reduce prices for imported oils."[37] The range of action that the President could take to limit imports under this provision is therefore quite narrow and it has never been implemented.

Section 101 of the Defense Production Act, as amended, provides that the President may "allocate materials . . . to such extent as he shall deem necessary or appropriate to promote the national defense."[38] Aside from the fact that civilian allocations must be based on historical supply patterns, there are three major legal and practical obstacles to utilizing this authority to control oil imports. First, "national defense" is defined in the Act to mean military, atomic, or directly related activity.[39] It is a more difficult standard to meet than the broad "national security" objectives which allow use of the Trade Expansion Act authority. Second, the purpose of the Act is to "allocate" supplies needed for national defense resulting from shortages, not to create shortages by restricting imports.[40] Finally, the authority may not be used "to control the general distribution of any material in the civilian market" unless it is a "scarce and critical material essential to the national defense" and defense requirements cannot otherwise be met.[41] Normal market conditions would not appear to meet this standard, although it would most likely be met during an oil embargo.

Under the International Emergency Economic Powers Act (IEEPA), the President may declare a national emergency to deal with any "unusual or extraordinary threat, which has its source in whole or substantial part outside the United States, to the national security, foreign policy, or economy of the United States."[42] Upon the declaration of a national emer-

35. Energy Policy and Conservation Act § 551, 42 U.S.C. § 6421 (1976).

36. Energy Policy and Conservation Act § 456, *supra* note 34, at § 760b(c).

37. *Id.* at § 760b(d).

38. Defense Production Act of 1950 § 101, 50 U.S.C. app. § 2071(a)(2) (1970).

39. Defense Production Act of 1950 § 762(d), 50 U.S.C. app. § 2152(d) (1970).

40. *See* Defense Production Act of 1950 § 2, 50 U.S.C. app. § 2662 (1970).

41. Defense Production Act Amendments of 1953 § 3, 50 U.S.C. app. § 2071(b) (1970).

42. International Emergency Economic Powers Act, 50 U.S.C.A. supp. § 1701(a) (1978).

gency, IEEPA permits the President to "investigate, regulate, direct and compel, nullify, void, prevent, or prohibit, any . . . importation . . . of . . . any property in which any foreign country or a national thereof has any interest."[43] The President is required "in every possible instance" to consult with Congress before exercising the authority and to submit a report to Congress explaining his action.[44] Although the emergency action is subject to several additional procedural requirements, the only one that poses a serious constraint on the President's authority is the right of Congress to terminate the emergency by concurrent resolution at any time.[45] In the event of a national emergency, the authority contained in the IEEPA could, therefore, be used in addition to the authority contained in the Trade Expansion Act to control oil imports.

43. *Id.* § 1702(a)(1)(B).
44. *Id.* § 1703(a).
45. *Id.* § 1706(b).

Defense Production Act Section 101(c)

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INTRODUCTION

The authority of the Government to require priority performance of contracts and to allocate materials under the Defense Production Act of 1950 (DPA)[1] was, for many years, the exclusive domain of national defense programs and regarded as essential to assure timely procurement. As a result of the 1973-74 oil embargo, energy was elevated to a level of importance comparable to national defense, and a need was recognized to facilitate completion of energy programs and projects essential to further this nation's energy independence.

In 1975, in an effort to stimulate the energy production and development necessary to mitigate the effects of any future embargo, Congress extended to energy programs authority previously available exclusively to national defense programs, that is, the priority assistance provisions of the Defense Production Act of 1950. The 1973-74 embargo underscored the need for accelerated energy development, and since most energy projects could not avail themselves of the provisions of section 101(a) of the DPA, section 104 of the Energy Policy and Conservation Act of 1975 (EPCA) added a new subsection (c) to DPA section 101.[2]

DPA section 101(c) authorizes the President to require, in certain circumstances, priority performance of contracts for supplies of materials and equipment needed to maximize domestic energy supplies.[3] The right to obtain a priority rating is

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1. Defense Production Act of 1950, 50 U.S.C. app. §§ 2061-62, 2071-73, 2091-94, 2151-63, 2164-68 (1970 & Supp. V 1975).

2. 50 U.S.C. app. § 2071(c)(1) (Supp. V 1975).

3. *Id.* DPA section 101(c) provides in part the following:

> (c) Domestic energy supplies.
>
> (1) Notwithstanding any other provision of this Act, the President may, by rule or order, require the allocation of, or the priority performance under contracts or orders (other than contracts of employment) relating to, supplies of materials and equipment in order to maximize

available both to public and private energy programs or projects, and the Department of Energy (DOE) is designated to play an essential role in distributing scarce materials and equipment to deserving energy projects. However, for reasons discussed in detail below, access to the provisions of section 101(c) have been limited, restricting DOE's role to directing materials to essential energy programs and projects in order to facilitate energy production and construction.

THE NEED FOR AN ADDITIONAL DPA SECTION

The terminology of the new subsection (c) is similar to that of DPA section 101(a) enacted in 1950.[4] In essence, if to do so promotes the national defense, the President is authorized by section 101(a) to direct a company to accept an order, and further to mandate delivery ahead of all other nonrated commercial orders of the supplier. This authority has long been recognized as an effective tool for assuring that defense-related programs are not delayed by an inability to obtain deliveries on schedule.

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domestic energy supplies if he makes the findings required by paragraph (3) of this subsection.

* * *

(3) The authority granted in this subsection may not be used to require priority performance of contracts or orders, or to control the distribution of any supplies of materials and equipment in the marketplace, unless the President finds that—

(A) such supplies are scarce, critical, and essential to maintain or further (i) exploration, production, refining, transportation, or (ii) the conservation of energy supplies, or (iii) for the construction and maintenance of energy facilities; and

(B) maintenance or furtherance of exploration, production, refining, transportation, or conservation of energy supplies or the construction and maintenance of energy facilities cannot reasonably be accomplished without exercising the authority specified in paragraph (1) of this subsection.

(4) During any period when the authority conferred by this subsection is being exercised, the President shall take such action as may be appropriate to assure that such authority is being exercised in a manner which assures the coordinated administration of such authority with any priorities or allocations established under subsection (a) of this section and in effect during the same period.

4. 50 U.S.C. app. § 2071(a) (1970) provides that:

The President is authorized (1) to require that performance under contracts or orders (other than contracts of employment) which he deems necessary or appropriate to promote the *national defense* shall take priority over performance under any other contract or order, and, for the purpose of assuring such priority, to require acceptance and performance of such contracts or orders in preference to other contracts or orders by any person he finds to be capable of their performance, and (2) to allocate materials and facilities in such manner, upon such conditions, and to such extent as he shall deem necessary or appropriate to promote the *national defense.* (Emphasis added.)

The national defense requirement of section 101(a), however, limits its usefulness for energy programs. The term "national defense" is defined in section 702(d) of the DPA as "programs for military and atomic energy production or construction, military assistance to any foreign nation, stockpiling, space, and directly related activity."[5] This definition excludes from the scope of section 101(a) most energy programs other than atomic energy programs, which often rely upon DPA section 101(a) for procurement, although use of DPA section 101(a) authority was extended on a limited basis to the builders of the Trans-Alaska Pipeline System and presumably would be available to an energy program which had a demonstrable national defense nexus.

The vast majority of energy projects, however, are not national defense-related, and the 1973-74 energy supply interruption underscored the need for expeditious development of energy resources, unhindered by nonenergy programs competing for scarce energy development-related resources. Congress responded by enacting the new section 101(c), extending priorities assistance to energy programs, whether governmental or nongovernmental, for purposes of materials and equipment procurement.

PREREQUISITES TO THE USE OF SECTION 101(c)

Section 101(c) priorities are not available for all energy projects. Congress legislated certain explicit prerequisites to the availability of priorities for energy programs so as not to interfere unduly with the national defense priorities under section 101(a). Since, for the first time, DPA section 101 priorities are available to nongovernmental projects, DOE exercises a critical control function in determining which energy programs or projects are entitled to priorities assistance.

The President is authorized to exercise the authority to require allocation of, or priority performance of contracts relating to, supplies of materials and equipment to maximize domestic energy supplies only if findings are made by the President that:

> (A) such supplies are scarce, critical, and essential to maintain or further (i) exploration, production, refining, transportation, or (ii) the conservation of energy supplies, or (iii) for the construction and maintenance of energy facilities; and

5. 50 U.S.C. app. § 2152(d) (1970).

(B) maintenance or furtherance of exploration, production, refining, transportation, or conservation of energy supplies or the construction and maintenance of energy facilities cannot reasonably be accomplished without exercising the authority specificed in [section 101(c)(1)].[6]

As a result of a series of delegations and redelegations of the President's responsibilities in Executive Order 11,912, as amended,[7] the following must occur before a rating under DPA section 101(c) may be authorized:

(1) DOE must determine that the proposed use of the authority will maximize domestic energy supplies.[8]

(2) DOE must find that the specific supplies in issue are critical and essential[9] to maintain or further exploration, production, refining, transportation, or the conservation of energy supplies, or for the construction or maintenance of energy facilities.

(3) Thereafter, the Department of Commerce must find that:

(a) such supplies are scarce; and

(b) maintenance or furtherance of the purposes described in two (2) above cannot reasonably be accomplished without use of the DPA authority.[10]

A "critical and essential" finding made by DOE will be based primarily upon evidence that the required items are in the "critical path" of the energy project. However, the scarcity finding to be made by the Department of Commerce turns on

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6. 50 U.S.C. app. § 2071(c)(3)(A) (Supp. V 1975).

7. Exec. Order No. 11,912, 41 Fed. Reg. 15,825 (1976), *as amended by* Exec. Order No. 12,038, 43 Fed. Reg. 4,957 (1978).

8. Congress provided no guidance in the statute or the legislative history of EPCA as to what was meant by the phrase "maximize domestic energy supplies." However, the factors to be considered by DOE in determining whether a program or project maximizes domestic energy supplies are listed in the DOE regulations, 43 Fed. Reg. 6,209, at 6,213 (1978) (to be codified in 40 C.F.R. § 216.4), and include, but are not limited to: (1) quantity of energy involved; (2) benefits of timely energy program furtherance or project completion; (3) socioeconomic impact; (4) the need for the end product for which the materials and equipment are allegedly required; and (5) established national energy policies.

9. The statute and legislation lists again provide no insight into what was meant by the terms "critical" and "essential." The factors DOE will consider in determining the critical and essential nature of needed materials and equipment are listed in the DOE regulations, 43 Fed. Reg. 6,209, at 6,213 (1978) (to be codified in 40 C.F.R. § 216.4), and include, but are not limited to: (1) availability and utility of substitute materials or equipment; (2) impact of the unavailability of the specific supplies of materials and equipment on the furtherance or timely completion of the approved energy program or project.

10. The only available guidance as to what factors the Department of Commerce will consider in making the scarcity and need to use the system findings is in proposed regulations 42 Fed. Reg. 43,038 (1977).

different criteria: The applicant must be able to demonstrate that there is a shortage of the necessary materials or equipment and that attempts to obtain them in normal commercial channels, even at a premium price, were unsuccessful. This finding is indispensable, since section 101(c) of the DPA cannot be used merely to obtain a better price. As stated in section 101(c)(3)(B), there must be a need to use the DPA system in order to accomplish the program's purpose, that is, no alternative means of satisfying current needs is available. Furthermore, it must be commercially possible for a contractor to provide the desired item within the time limits deemed necessary by the applicant. A DPA priority obviously cannot shorten the time physically needed to fabricate equipment.

USE OF SECTION 101(c)

Once the appropriate findings are made by DOE and the Department of Commerce, the priority rating is issued. With the rating, a purchaser may go to its supplier, and the order must be placed ahead of other nonrated commercial orders according to the terms of the priority rating. DOE regulations[11] provide that use of the rating is governed by the same Department of Commerce regulations as a defense rating under section 101(a).[12] Congress preferred to integrate the defense and energy priorities systems, thereby avoiding parallel systems with competing claims and competing justifications for distributing scarce resources.[13] If a defense and energy program are competing for the same limited resources, the Commerce Department would act as arbiter and determine which program is entitled to the highest priority.

Since the enactment of DPA section 101(c), DOE has received six applications for priorities assistance,[14] of which three were withdrawn before an opportunity for full consideration was given. Of the three applications processed, the U.S. Army

11. 43 Fed. Reg. 6,209, at 6,213-14 (1978) (to be codified in 10 C.F.R. § 216.5).

12. 32A C.F.R. pt. 621 (1977) of the Defense Management System Regulation 1 relates to priorities for certain controlled materials such as copper, brass, nickel, etc. 32A C.F.R. pt. 651 (1977) of the Defense Priorities System Regulation 1 relates to all other priorities.

13. 121 CONG. REC. S5,364 (daily ed. April 7, 1975) (remarks of Sen. Proxmire). 50 U.S.C. app. § 2071(c)(4), *supra* note 4, requires that priorities and allocations under subsection (a) be coordinated with those under subsection (c).

14. This includes applications received by the Federal Energy Administration, which was responsible for DPA section 101(c) before DOE's organization in October 1977.

Corps of Engineers received priority authorization in two separate instances for circuit breakers for hydroelectric projects. The third request was by a Federal government agency for a priority to expedite delivery of a computer system needed for quantitative analysis to support energy legislation. This application was rejected by DOE as legally insufficient in meeting the tests required by DPA section 101(c) for maximization of domestic energy supplies.

Although both sections 101(a) and (c) authorize the granting of priorities for essential needs, there are significant differences in the scope of the priorities which can be issued. Section 101(a), by its terms, could be utilized to obtain a priority on any national defense-related contract, except contracts of employment, including, among other items: equipment, services,[15] petroleum, gas, electric power, transportation, as well as contracts for materials and facilities.

Section 101(c) was intended to be more restrictive in its scope. In addition to the prerequisites discussed above that the needed items must be scarce, critical, and essential to production, conservation, construction, etc., section 101(c) is limited by its terms to "materials and equipment,"[16] which would include such items as pumps, valves, hardware, pipe, etc.[17] It would appear that items such as transportation, facilities, and electric power are beyond the scope of section 101(c).[18]

The availability of section 101(c) for energy programs outside of the United States is limited both by the terms of the statute and the regulations. Priorities only are available to maximize "domestic" energy supplies.[19] In addition, DPS Regulation 1, section 23(a), restricts the scope of the DPA by pro-

15. Basic Rules of the Defense Priorities System (DPS Reg. 1), 32A C.F.R. pt. 651, § 13 (1977).

16. "Materials" are defined in section 702(b) of the DPA, 50 U.S.C. app. § 2152(b) (1970), as including "raw materials, articles, commodities, products, supplies, components, technical information, and processes."

17. A question exists as to whether a priority could be obtained under section 101(c) for certain "services." Section 101(c) also does not specifically mention services, although the Department of Commerce has read services into that section. *See* 32A C.F.R. pt. 621, § 13 (1977).

18. 43 Fed. Reg. 6,209, at 6,210 (1978). The exclusion of energy sources from section 101(c) priorities is reasonable since, if these items were covered, the Department of Commerce would have the authority to allocate energy, and conflicts could arise between DOE allocation regulations promulgated pursuant to authorities other than the DPA and the DPA directives issued by the Department of Commerce.

19. 50 U.S.C. app. § 2071(c)(1) (Supp. V 1975).

viding that: "All regulations and orders of BDC [Bureau of Domestic Commerce], unless specifically stated otherwise in such regulations and orders, shall apply to transactions in any state, territory, or possession of the United States and the District of Columbia."[20]

These restrictions seemingly would not prevent a domestic firm from seeking priorities assistance for materials to construct a facility on foreign territory so long as the ultimate benefit is to maximize United States energy supplies.

CONCLUSION

The effectiveness of DOE in directing scarce materials to essential energy projects is, of course, limited by the number of applications for priorities assistance. As noted above, since the enactment of the EPCA in December 1975, DOE has received fewer than ten applications for priorities assistance under DPA section 101(c). Perhaps this is a result of there being no shortages of materials and equipment needed for energy programs. It is also possible, however, that the extensive applications, requirements, and findings have discouraged potential applicants from resorting to priorities assistance under DPA section 101(c).

It would be more likely, however, that a lack of general familiarity by the energy industry with DPA section 101(c) has resulted in its limited use: priorities assistance always had been the exclusive domain of the defense industry, with recipients of Government defense contracts being the primary beneficiaries. However, given the recent emphasis on energy development and the resourcefulness of private industry, requests for priority assistance may begin to proliferate, expanding DOE's role in allocating scarce resources to essential energy programs.

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20. 32A C.F.R. pt. 651, § 23(a) (1977).

Crude Oil Price Controls: Their Purpose and Impact*

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I. INTRODUCTION

Crude oil price controls are a part of the great body of federal and state regulations which govern the activities of the petroleum industry. Price controls are a rather recent addition to four decades of petroleum industry regulations, which generally have fit into one of the following classifications: market demand prorationing plans, oil import quotas, allocation programs, and price controls. The market demand prorationing plan and oil import programs were designed to raise crude oil prices above their competitive levels, thus stabilizing prices and transferring funds from consumers to producers. Crude oil and product price regulations have the opposite effect; *i.e.*, they are designed to keep prices below world levels and transfer income from producers to consumers.

The current regulations prevent owners of lower cost oil with fixed production costs from seeking the world price of crude oil as established by the Organization of Petroleum Exporting Countries (OPEC). Under this scheme, controls prevent crude oil and petroleum product prices from reflecting the OPEC price of crude. This lower-than-market domestic price of petroleum encourages demand, reduces domestic production, and increases imports of foreign crude as the marginal source of supply to satisfy domestic demand, and thus increases the United States' dependence on an uncertain supply of crude oil. The evidence suggests that these regulations, coupled with environmental restrictions, create a negative impact on the supply of petroleum in the United States.[1] Prorationing plans have diverted investment toward development drilling,

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* The views expressed herein are those the authors and should not be taken as representing the views of either of their employers.

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1. *See, e.g.*, D. BOHI & M. RUSSEL, U.S. ENERGY POLICY 4 (1975).

away from exploration in highly risky but potentially more productive petroleum regions or basins. Together, prorationing and import controls have discouraged necessary investment in domestic refining capacity. Prorationing, by restricting production, has limited the refiners' sources of domestic feedstocks, and import limitations have restricted the refiners' ability to substitute foreign for domestic feedstocks. Likewise, import quotas have reduced competition and efficiency in domestic production, since import quotas are set so that they cannot replace domestic production, a situation which has allowed U.S. producers to exercise effective monopoly power through complete control of both domestic and foreign supplies. Without an import quota, the ability of prorationing to restrict output and allow crude oil prices to rise above their competitive levels would be neutralized by the substitution of imported crude for domestic production.

Price controls on petroleum tend to weaken any incentive by the industry to respond to increased demand for products. Regulated natural gas markets have discouraged producers from exploring for new fields in the face of declining gas reserves. Since natural gas and petroleum are joint products, price controls on both have contributed to their declining reserve positions.

Under any energy program, the average price of domestic crude oil is regulated to be lower than the price of imported crude oil, and as such, the average refiner acquisition cost for domestic crude oil is considerably below that of imported crude. Under each of the Nixon, Ford, and Carter energy programs, phased decontrol of domestic crude oil prices has been deemed preferable to immediate decontrol. Since the domestic production of crude oil is no longer sufficient to meet domestic demand, the marginal barrel of crude oil needed to satisfy this increased demand must come from foreign sources.

From the standpoint of market efficiency, regulations are usually considered harmful in that they reduce production, distort market mechanisms, and fail to account for the interaction of supply and demand. For equity reasons, however, regulations are often necessary to protect consumers, assign costs to externalities, and preserve national security. This paper will discuss the efficiency aspects of crude oil regulations and their consequent impacts on price, domestic production, market distortions, and imports. The study will be divided into three

parts: Pre-Embargo Controls, Post-Embargo Controls, and an Economic Analysis of Controls.

II. PRE-EMBARGO CONTROLS

As demonstrated by MacAvoy[2] and Mead,[3] the crude oil segment of the petroleum industry has been subject to government regulation since the 1930's, though the purpose of the regulations has changed dramatically over the years. Current regulations are designed to restrain prices and transfer industry rents[4] from the producers of crude oil to the consumers of petroleum products. On the other hand, the earliest regulations transferred funds from the consumers to the producers by restricting supply and thereby stabilizing prices at higher than open market levels.

A. *Domestic Prorationing Schemes*

In the 1930's, the major petroleum-producing states joined together to develop a system of prorationing under which any given producer was allowed to produce only a percentage of the maximum efficient rate of recovery from a given reservoir.[5] In 1935 the major producing states executed the Interstate Oil Compact to Conserve Oil and Gas.[6] The prorationing plans encouraged in the compact were designed to prevent overinvestment in oil wells and overproduction from any given reservoir, with state agencies setting the allowable rates of production. Many states have continued to employ alternative forms of these maximum efficient recovery (MER) plans over the last four decades, and while no single plan has ever worked flawlessly, MER's have helped to limit the wasteful production and wild price fluctuations which characterized the early 1930's.

Obviously, the prorationing plans fixed prices and eliminated competition among producers. If permissible production rates were established at too low a level, refiners would com-

2. FEDERAL ENERGY ADMINISTRATION REGULATION (P. MacAvoy ed. 1977) [hereinafter cited as MacAvoy].

3. W. Mead, *Petroleum: An Unregulated Industry?* ENERGY SUPPLY AND GOVERNMENT POLICY 130-160 (R. Kalter & W. Vogely eds. 1976) [hereinafter cited as Mead].

4. Rents may be defined as unrealized gains to the owner of a scarce commodity which is fixed in quantity, whose market value has increased since the owner's procurement.

5. There have been a number of different prorationing plans. The rationale behind each type is explained in Mead, *supra* note 3, at 132-48.

6. The U.S. Congress by joint resolution gave its consent to the compact. *See* J. Res. of Aug. 27, 1935, Ch. 781, 49 Stat. 939 (1935).

plain that they were unable to obtain crude at the current price; the state agency would then either increase the production percentages or raise the price of crude. Production in excess of state-established limits for interstate shipment was prohibited by the Connally Hot Oil Act of 1935.[7] This state of affairs was not changed notably by peacetime legislation for the next twenty-five years.

B. *Oil Import Controls*

When low cost foreign crude oil threatened prorationing plans, and thereby the price of domestic crude oil, the President (at the urging of congressmen whose districts were being affected) established the Mandatory Oil Import Program (MOIP) of 1959.[8] This program set volumetric limits on the amount of crude oil and related products which could be imported. While the regulations and operation of MOIP underwent several changes, the effect was to insulate the price of domestic crude oil from lower world prices. Under this program the quantities of imported oil were rigidly fixed, and the marginal barrel of crude oil necessary to satisfy domestic demand was supplied from domestic petroleum sources.

Declining domestic production of crude oil since 1970, coupled with increased demand, has caused the allowable rate of production under the MER plans to be fixed at 100% by the appropriate state commissions. With full production now permitted, there no longer exists any excess production capacity in the domestic petroleum industry; producers may now provide as much as is profitable to satisfy domestic demand.

Effective May 1, 1973, President Nixon eliminated MOIP's volumetric limits on oil imports.[9] The removal of the quota system exposed a severe shortage of domestic refinery capacity. Refineries which would have been constructed in the United States were built abroad instead, since the quota system had restricted entry into the United States of foreign crude

7. 15 U.S.C. § 715 (1976).

8. Pres. Proc. No. 3279, 3 C.F.R. 11 (1959-1963 Compilation), *reprinted in* 19 U.S.C. § 1862 (1976), and in 73 Stat. c25 (1959). For a detailed account of the history and politics of the mandatory oil import program from 1959-1973, *see* Mead, *supra* note 3, at 148-54.

9. Pres. Proc. No. 4210, 3 C.F.R. 239 (1971-1975 Compilation), *reprinted in* 87 Stat. 1187 (1973). License fees, however, continued to be charged on imported oil: $0.21 per barrel of crude, and $0.63 per barrel of product.

oil supplies. In 1973 domestic U.S. refiners were operating at almost 100% of capacity.

C. *Price Controls*

The United States' first major peacetime experience with petroleum price controls occurred with the Nixon Administration's announcement of a ninety-day wage-price freeze (Phase One) on August 15, 1971.[10] The current crude oil price regulations of the Department of Energy are an extension of the regulations originally promulgated under Phase One. While the program affected petroleum products as well as crude petroleum, the discussion here will focus only on crude oil aspects of price controls.

Prior to the summer of 1971, there had been gasoline price wars among the major brand gasoline dealers. Markets, however, stabilized prior to the establishment of controls, and at the initiation of the price freeze, gasoline prices charged by oil company retail outlets were at normal or near-normal levels. The integrated petroleum companies enjoyed some flexibility under the freeze. Traditionally, major petroleum companies had provided bulk purchasers of gasoline and refined products with discounts below the posted prices. As the discount contracts expired, the suppliers refused to renew them at the discounted level and insisted on selling their petroleum only at the full posted price. Thus, despite the freeze, these companies in effect were able to raise their prices. This practice placed a squeeze on the profits of independent marketers whose products were subject to the freeze but whose inputs were now purchased at nondiscounted prices. These price distortions continued into the second stage of the Nixon wage-price program.

Phase Two lasted from November 15, 1971 to January 11, 1973.[11] Ceiling prices which had been set during the Phase One freeze became base prices for Phase Two. Under Term Limit Pricing (TLP) arrangements, companies were allowed to increase prices of their products for a specified period of time,

10. Exec. Order No. 11,615, 3 C.F.R. 602 (1971-1975 Compilation), 12 U.S.C. § 1904 n (1976). A detailed account of the regulations and the impact of controls during the Nixon Administration's Economic Stabilization Program is presented in W. Johnson, *The Impact of Price Controls on the Oil Industry: How to Worsen an Energy Crisis*, in ENERGY: THE POLICY ISSUES 100-109 (G. Eppen ed. 1975) [hereinafter cited as Johnson].

11. The first announcement of a change in the structure of controls came in Exec. Order 11,627, 3 C.F.R. 621 (1971-1975 Compilation).

provided the weighted-average price increases were consistent with specific cost passthrough and profit margin rules set by the newly established Price Commission. Companies were allowed to spread price increases in any manner across products subject to TLP, but were severely limited in adjusting relative prices for products excluded from TLP arrangements. In the petroleum industry, three-fourths of the refinery yield was excluded. For example, crude oil prices were excluded from TLP agreements if the crude was resold by refineries, while first-sale prices of crude oil were included in TLP arrangements.

During 1972 and continuing into 1973, shortages of crude oil and some refined products began to appear. For example, the controls prohibited price increases on gasoline and number two home heating oil above their August 1971 price levels. However, during the summer months, gasoline prices were at relatively high levels compared to heating oil prices. Since the refiners believed that heating oil prices would not be allowed to follow their seasonal pattern and rise during the winter, they had no incentive to increase their output of heating oil when the winter months arrived, and shortages began to occur.

Phase Three[12] was the government's response to these and similar problems; it was to have provided industry with greater flexibility in conducting business, within fixed price guidelines. Business was to comply on a voluntary basis with standards for cost increases contained in the Phase Three regulations; the Price Commission was abolished and the Cost of Living Council was called upon to monitor compliance with the new standards. As Phase Three began, the combined factors of pent-up demand pressure for petroleum products, decreasing domestic crude production, and a worldwide shortage of crude oil resulted in sharp increases in the price of crude oil and products. On March 8, 1973, however, the Cost of Living Council issued Special Rule Number One,[13] which reimposed mandatory controls on the twenty-three major companies in the petroleum industry,[14] and produced an unfortunate set of incentives which contributed to the shortage of crude in the United States. First, the rule restricted the ability of the majors to raise prices above

12. *See* Exec. Order No. 11,695, 3 C.F.R. 741 (1971-1975 Compilation).

13. 38 Fed. Reg. 6284 (1973).

14. These companies had individual sales in excess of $230 million, and in the aggregate conducted 45% of the industry's sales.

specified percentages, and prohibited them from increasing prices if their profits were over specific base period profit margin levels. Since the largest companies owned and operated profitable holdings, their profits exceeded the base period levels, and thus they were prohibited from passing on higher foreign crude oil costs to their customers. At the same time the rule enabled smaller refiners to bid up the price of crude oil. Since the higher price of foreign crude could not be passed on by the majors, the smaller refineries succeeded in diverting crude from the majors. A second negative byproduct of Special Rule Number One arose from the fact that the major U.S. producers with foreign operations faced a reduction in profits on refined products if the crude was sold in the United States and they were at the profit margin constraint. By selling this crude oil abroad rather than shipping it to the United States, the majors were able to maximize profits, since foreign sales were unaffected by the Phase Three rules. This circumstance further aggravated the shortage of crude oil in the United States and placed more pressure on crude oil prices, exacerbating crude shortages to domestic refiners. A crude oil allocation program eventually was enacted[15] to alleviate the crude shortages created by Special Rule Number One.

Phase 3½ froze all petroleum prices from June 13, 1973 to August 12, 1973.[16] During this period even the increased prices of imported crude oil could not be passed through to consumers in the form of higher product prices. Since imported crude oil prices were rising, this rule effectively stopped all crude purchases by refiners and eventually produced severe petroleum product shortages in the fall of 1973.

Phase Four took effect on August 13, 1973, and continued until December 1973 when all petroleum price controls were transferred to the Federal Energy Office from the Cost of Living Council.[17] The new regulations benefited immensely from the failings of Phases Two and Three, with their reliance on controlling only the major companies: now the pricing of petro-

15. Emergency Petroleum Allocation Act of 1973 (EPAA), 15 U.S.C. §§ 751-760h (1976), discussed *infra*.

16. Announced by President Nixon in Exec. Order No. 11,723, 3 C.F.R. 774 (1971-1975 Compilation).

17. Phase Four regulations were originally set forth in 38 Fed. Reg. 19,462-86 (1973) (proposed), and amended in 38 Fed. Reg. 21,592-613 (1973). Provisions relevant to crude oil appear at 38 Fed. Reg. 19,481-83 (1973).

leum and its products by *all* parts of the industry would be covered. A two-tiered pricing system was established which differentiated between controlled "old" oil and uncontrolled "new" oil. While designed to stabilize the price of crude produced from existing properties, it also provided an incentive to producers to seek out higher cost production from new properties, or to use enhanced recovery techniques to increase production from existing properties.[18] "Old" oil was defined as oil produced from a given property in an amount equal to or less than the amount produced in the same month of 1972 by that property. It was subject to price controls fixed at the May 15, 1973 price of crude oil from the given field, plus thirty-five cents per barrel. The lower tier thus had the effect of preventing the industry from accruing rents on existing properties. Uncontrolled "new" oil was defined as production from new wells on properties not operative in 1972, or production from 1972 properties in excess of 1972 production levels. "Stripper" oil, from wells producing less than ten barrels per day, was not subject to controls. In addition, for each new barrel of crude oil produced on an existing property, a barrel of old oil would be released from lower tier controls. This "released" oil was free of controls and was used as an inducement for producers to increase production above 1972 levels on existing properties. New and released oil were free to seek the uncontrolled import price level. Thus, the two-tiered system was designed to increase domestic crude oil production by raising the crude oil price at the *margin* for each new barrel of oil, while allowing the *average* price for new and old oil to determine refinery product prices.

Although the two-tiered system did encourage new exploration and development, it created problems for refineries. Since each refiner did not have access to the same proportions of controlled and uncontrolled crude oil, the system produced significant differentials between refiners in ultimate product prices. Retail gasoline prices in the same city often differed by as much as twelve cents per gallon.[19] The self-sufficient refinery purchaser had to charge oil into the refinery at the controlled

18. Enhanced recovery techniques are methods of recovering additional energy from a reservoir by fluid or chemical injections. The oil generated by fluid injections is called "secondary" oil, while the result of chemical injections is called "tertiary" oil.

19. Johnson, *supra* note 10, at 110.

price, and the low controlled prices then had to be carried through into low product prices. This procedure placed the uncontrolled crude purchaser at a disadvantage in the product market, since higher price crude imports were charged into the refinery at the higher import price and yielded higher priced refined products. The two-tiered system thus discouraged investment in expansion of refinery capacity.

III. POST-EMBARGO CONTROLS

The Yom Kippur War of October 1973 resulted in an embargo on the sale of crude oil to the United States by the OPEC nations. With the threat of a severe shortage of crude oil supplies, the stage was set for implementation of a crude oil allocation procedure designed to avert the harshest effects to consumers of the impending crude shortage.

A. *Emergency Petroleum Allocation Act*

The Emergency Petroleum Allocation Act (EPAA) became effective on November 27, 1973 and provided for the mandatory and equitable allocation of crude oil among the nation's refiners on a quarterly basis.[20] Under a buy/sell agreement, refiners having a higher percentage of crude oil supplies than the national average (in relation to their refining capacity) were required to resell their crude to refineries with below normal crude availability. Under the allocation scheme, the Federal Energy Office (FEO) took over administration of the EPAA from the Cost of Living Council in December 1973. The effect of the EPAA was to penalize those companies with preestablished crude supplies and to weaken the market function by placing FEO in control of crude allocation.[21]

During the period of the embargo (October 1973 through April 1974), the regulations established under the EPAA remained unchanged. With the end of the embargo in the spring of 1974, legislation was signed establishing the Federal Energy Administration (FEA),[22] which was given authority to administer the regulations established and formerly administered by FEO. The only major changes made in the regulations by FEA in the remainder of 1974 were modifications of the buy/sell program and creation of a crude oil entitlements program. The

20. 15 U.S.C. §§ 751-760h (1976).

21. *See* Mandatory Allocation Regulations amending 10 C.F.R. §§ 200-202 (revoked), 205 (added), 210-212 (added), *reprinted in* 39 Fed. Reg. 1924-1961 (1974).

22. Federal Energy Administration Act of 1974, 15 U.S.C. §§ 761-787 (1976).

original buy/sell program had caused two major problems: (1) the requirement of crude oil sharing among majors had forced needless transfers of supplies between majors experiencing mere short term imbalances, increasing unnecessary bureaucratic costs; and (2) disincentives to purchase imported crude oil, as discussed above. The buy/sell program was modified on May 14, 1974, to limit the sellers of crude oil to the fifteen largest refiners, and the buyers to the smaller refiners.[23] Some imported oil disincentives were also addressed.

B. *Entitlements Program*

In November 1974 the EPAA was supplemented by a crude oil entitlements program designed to equalize crude oil costs varying among refiners as a result of the two-tiered price control system.[24] Under the program, refiners having crude oil in excess of the national average were required to purchase entitlements from refiners having less than the national average. The purpose of the program was to correct inequities created by the earlier price control and allocation procedures; one intended effect was the creation of a bias favoring smaller refiners. Large OPEC price increases in late 1973 had produced a tremendous gap between upper and lower tier oil prices. Depending on the mix of old, new, and imported oil available to the refineries, the average price of imports available had continued to vary considerably. Refineries with more old oil than the national average were forced to purchase entitlements in order to use their excess lower tier oil, while those having less than the average low-cost crude could sell their entitlements. Small refiners were given additional entitlements as a subsidy to help them compete with the majors; these entitlements either could be sold or used to acquire crude oil at a cost below the majors' acquisition cost.[25] The small refiner bias effectively raised the cost of crude oil to large refiners, whose costs were obviously key determinants of the final price of refined products. In addition, the bias encouraged the use of smaller, less efficient refineries.

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23. Amendments to 10 C.F.R. §§ 211.61-211.68, 211.71, 212.88 (revoked), 212.94 *reprinted in* 39 Fed. Reg. 17,288-93 (1974).

24. Amendments to 10 C.F.R. §§ 211.66, 211.67, 212.131, *reprinted in* 39 Fed. Reg. 42,246-50 (1974).

25. *See generally* MacAvoy, *supra* note 2, at 12.

C. *The Energy Policy and Conservation Act and the Energy Conservation and Production Act*

Current crude oil controls operate under laws passed in December 1975 and August 1976. The Energy Policy and Conservation Act (EPCA) of 1975 provided for the phasing-out of price regulations on crude oil over a forty-month time period.[26] The plan established a fixed national average price for all crude oil, which the Federal Energy Administration was given power to adjust by up to 10% per year. Initially, the average price was set at $7.66 per barrel, which was the share-weighted average price of old oil at $5.25 per barrel and upper tier oil at $11.28 per barrel. The upper tier included new oil, released oil, and stripper oil; a third tier not included in the composite existed for uncontrolled imported oil, which sold for approximately $13.25 per barrel. Following passage of EPCA, revisions were made in existing crude regulations to conform to EPCA, including elimination of the released oil category and introduction of a mechanism whereby the base period production level for a given field was placed on a declining basis to correspond with the historical decline rate for each field.[27] In addition, the lease definition was modified to treat new reservoirs developed on old leases as new property, thereby making them available for upper tier rather than lower tier prices.[28]

The Energy Conservation and Production Act (ECPA) of 1976, modified EPCA by exempting stripper oil from upper tier controls.[29] However, stripper oil supplies were still to be included in the calculation of the upper tier price, which prevented the exemption of stripper oil from having an effect on the share-weighted average price of crude oil remaining controlled. Tertiary oil supplies were exempted from controls and allowed to sell at the world oil price, but were not included in the average price.

Current crude oil controls focus on elimination of rents to owners of lower cost old petroleum, unlike the rules in the pre-embargo period, which were aimed at holding down prices and

26. 42 U.S.C. §§ 6201-6422 (1976).

27. FEA began assuming a decline rate of 8% as an average for all fields, based on analysis of a number of sites.

28. Amendments to 10 C.F.R. §§ 212.72, 212.75, *reprinted in* 41 Fed. Reg. 36,172-85 (1976).

29. 42 U.S.C. §§ 6801-6892 (1976).

forcing producers and refiners to absorb increasing costs. The current control system prevents domestic crude oil from reflecting the OPEC price of crude oil. However, any intended benefits of the program are not without costs to the industry and the taxpayer.[30] For the industry there are compliance and administrative costs, interference with distribution patterns, and uncertainty as to the direction of future regulation. The taxpayers bear the costs of increased regulation via higher prices and reduced efficiency. The various programs discourage refinery expansion, continue to be biased in favor of less than optimal refinery utilization, and cause higher marketing costs. The present controls program is exceedingly complex and difficult to enforce.[31] Summary comments from other studies illustrate these points.

MacAvoy concluded that the costs of today's crude oil regulations outweigh their benefits: current market conditions show adequate world supplies of crude and do not warrant continuation of product pricing and allocation regulations. He estimated that the petroleum industry pays reporting and administrative costs for compliance as high as $570 million annually, while the administrative costs of the program maintained by FEA could be costing the taxpayers $47 million per year.[32] In addition, controls could produce longrun inefficiencies by encouraging refineries of less than optimal size (small refiner bias), and inefficiency in the distribution of products.

In analyzing the effects of crude oil controls, Cox and Wright reached similar conclusions. While they found that the entitlements program did equalize refiner crude costs, it had the additional effect of artificially reducing the market price of products and increasing product demand in the absence of an appropriate supply response. Further, the EPAA and EPCA policies increased United States dependence on foreign sources, since the entitlements program provided a subsidy to imported crude oil.[33]

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30. For a detailed discussion of the costs to industry and taxpayers of compliance and enforcement of petroleum regulations, *see* MacAvoy, *supra* note 2, at 39-89.

31. For a discussion of procedural problems with the current regulatory program, *see* MacAvoy, *supra* note 2, at 91-138.

32. *Id.* at 143.

33. Cox & Wright, *The Effects of Crude Oil Price Controls, Entitlements and Taxes on Refined Product Prices and Energy Independence*, 54 LAND ECON. 1-15 (Feb. 1978).

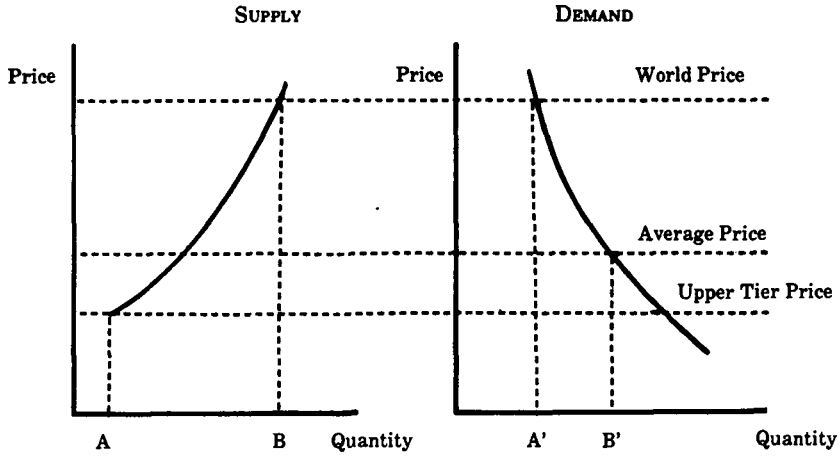
Morici's analysis concluded that the benefits of price regulations to petroleum consumers and refiners were outweighed by the costs to crude oil producers and the loss of efficiency in production.[34] The cost of transferring windfall profits from crude producers to product consumers and refiners yields a negative net welfare gain. Consumers obviously benefit from lower product prices and higher consumption levels as long as refineries pass on their lower crude costs, which have not been fully dissipated by higher refinery costs. However, Morici concluded that this regulated system has the effect of subsidizing crude oil imports and reallocating domestic resources to less efficient users.

IV. AN ECONOMIC ANALYSIS OF CONTROLS

This analysis first will employ a simple static supply and demand model to examine the impact of EPCA-type price controls on consumers, producers, and the international oil markets. Assuming that oil supplies are not perfectly inelastic,[35] which is consistent with both theoretical analysis and empirical work, Figure One illustrates the impacts of EPCA-type price controls on oil demand and supply.[36]

Figure 1

Static Representation of Crude Oil Supply and Demand



34. Morici, Jr., *The Benefits and Costs of Crude Oil Price Regulations*, 3 J. EN. & DEV. 366-77 (Spring 1978).

35. *I.e.*, that oil supplies do not respond to changes in oil price. This could be demonstrated graphically as a vertical line in Figure One.

36. This analysis relies on the work of Cox and Wright, *supra* note 33, which shows

In the case of producers subject to price controls, the upper tier price will equal the marginal cost of production, a figure normally used by producers to compute the profit-maximizing production rate. Given a positively sloped supply curve, production will be lower under price controls than in the absence of price controls. This production loss equals B minus A on the supply function. However, the dynamic solution discussed in the next section may yield far different results.

Because of the exclusion of enhanced recovery techniques in the EPCA, the upper tier price controls are more likely to retard exploration and development of new oil properties than they are to deter investment in enhanced recovery. The new regulations regarding stripper well pricing may induce some suppliers with relatively low producing properties to retard production for a period of time in order to receive stripper well classification and therefore maximize profits in the long run. These types of exceptions in the current regulations tend to alter the simple static analysis presented *supra;* they are, however, relatively small when compared to overall production magnitudes.

The impact on oil demand is straightforward when using the static model illustrated in Figure One. Since consumers base their consumption decisions on the *average* oil price, their oil demand will be greater than the level implied by the *world* oil price. In this figure, demand increases by the amount B' minus A'. However, there is an additional impact on the demand curve caused by the crude oil price regulations, which alter the shape of the demand curve, making it relatively more inelastic above the average price than would be the case otherwise. This is due to the fact that if world oil prices increase by 1% for example, the average price to the consumer increases by somewhat less than 1%, because of the weighting of domestic and imported oil. Therefore, the demand curve becomes relatively more inelastic above the average price than the simple static model would suggest. To summarize in hard figures, the current EPCA price controls impose a wealth transfer from producers to consumers which Montgomery estimates will amount to approximately $2 billion by 1985.[37]

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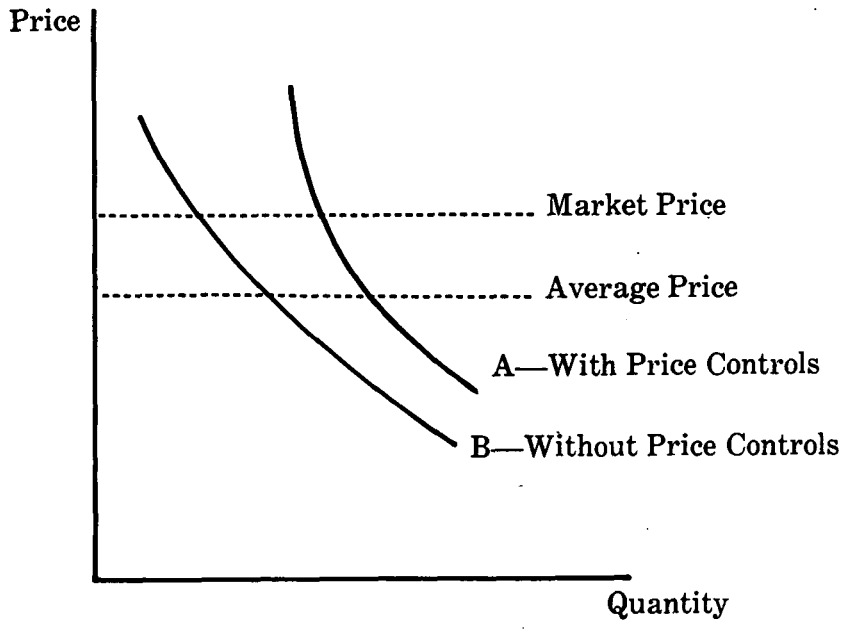
that controls have reduced total, average, and marginal crude oil costs, and therefore, product prices.

37. W. D. Montgomery, The Transition to Uncontrolled Crude Oil Prices (unpub-

Price controls also have a diversified effect on the international oil market. The effect on imports is the sum of the production supply effect and demand response of (B-A) + (B'-A') in Figure One, which translates into a direct additional demand for OPEC oil. This is further illustrated in Figure Two, where the demand for OPEC oil is shown with and without price controls (curves A and B, respectively). As already demonstrated, price controls tend to make the demand curve for oil more inelastic above the average price, as shown by curve A in Figure Two. This effect is also relevant when examining the supply curve for OPEC oil, where a 1% change in the world oil price will cause less than a 1% change in the average price facing customers. This effect would clearly impact the profit maximizing price that OPEC would set; however, the static model will not indicate in what direction OPEC would adjust its prices to maximize profits.

Figure 2

The Demand for OPEC Oil



lished paper presented at the National Bureau of Economic Research, Conference on Public Regulation, Washington, D.C., Dec. 11, 1977).

Another possible international consequence of price controls is that they might tend to create demand competition among the oil-consuming nations, causing more rapid depletion of the world's supply of crude. Since price controls in the United States tend to increase imports, OPEC must deplete its resources faster than it might otherwise, in order to meet this demand.[38] This action would effectively leave less oil available to other consuming countries in later years, which might create an incentive for them to impose their own price controls in competition with the United States in order to maintain their share of consumption. The result, other factors remaining constant, would be a more rapid depletion of reserves.

For any finite resource the timing of extraction is critical to the producer, since it represents one of the most important variables in the profit maximization calculation. Therefore, a dynamic analysis model must focus on the timing of extraction and on price expectations. To the present, there have been no theoretical analyses of the behavior of the petroleum industry under imposed price paths, particularly when these paths are highly uncertain. A few possible solutions to the dynamic problem can be suggested, but these should not be construed as definitive or exhaustive of the possibilities.

If the controlled price is held constant in real terms, assuming prices are known with certainty, initial production would be lower than could be expected absent controls. However, total production continues to increase over time, as depicted in Figure Three by the areas under triangles OAA' and OBB'. We assume that the areas under both production curves OAA' and OBB' are equal, implying identical total reserves under either production curve. However, it is highly likely that total reserves would be lower in the controlled price situation, since the level of recoverable reserves is also a direct function of price. Therefore, the most likely case is that curve OCC' would be the more accurate representation of production in the absence of price controls.

Montgomery has shown also that if controlled prices are

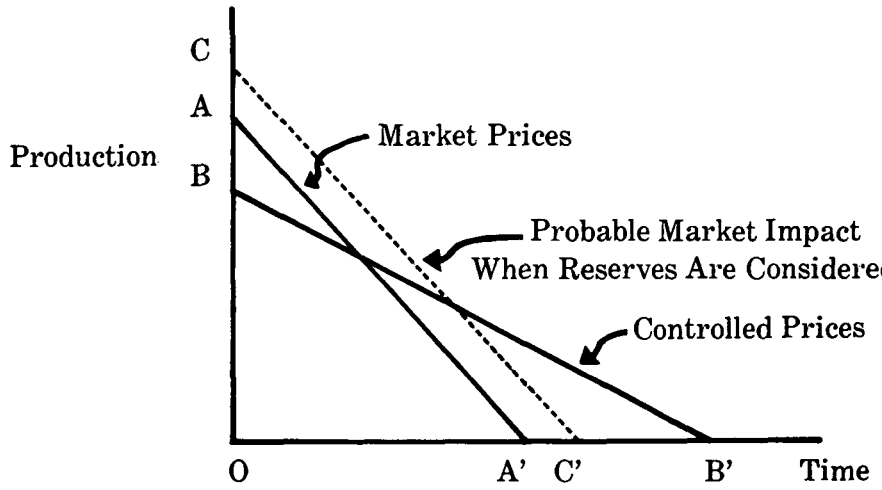
38. This assumes that OPEC has excess supply production capacity, which is presently the case. However, if this capacity disappears, the excess demand would serve to raise the world oil price for all consuming nations. At that point the U.S. effectively would be paying for its price controls through foreign exchange differentials and other macroeconomic occurrences.

increasing so that the difference between the world price and controlled prices is greater than the real rate of interest, resources will be depleted sooner than under the controlled situation, as shown in the second chart of Figure Three.[39] Again, it is reasonable to assume that the total level of reserves is a function of the level of the controlled price. Since the controlled price remains below the market price, the dotted line EE' would be the most likely solution if price controls were lifted. It is important to note that FF' could well lie below the market price solution in most years since this line is determined by the price/recoverable reserve relationship. Thus, the final solution to the dynamic problem is even more uncertain.

Figure 3[40]

A Dynamic Representation of Oil Production

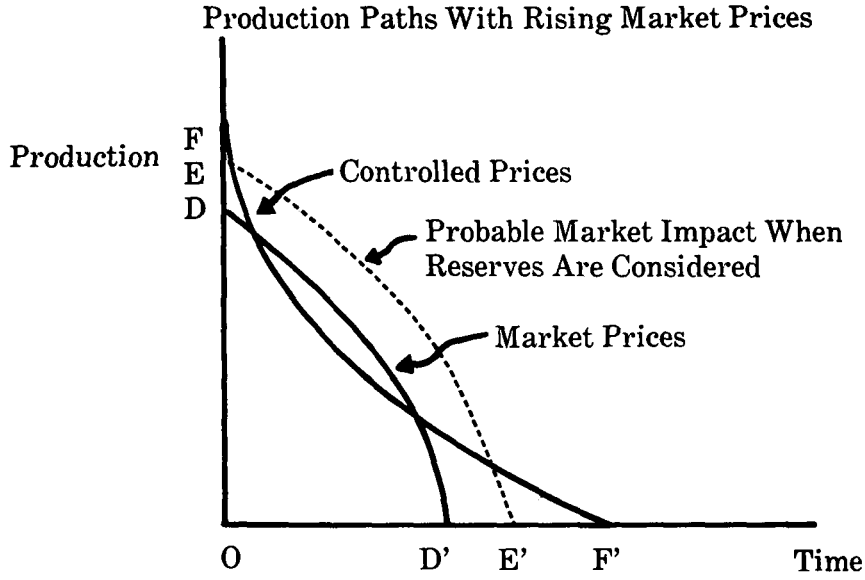
Production Paths When Market and Controlled Prices are Constant



39. Montgomery, note 37 *supra*.

40. Taken from *id.*, with the exception of the dotted lines depicting the impact of price on available reserves.

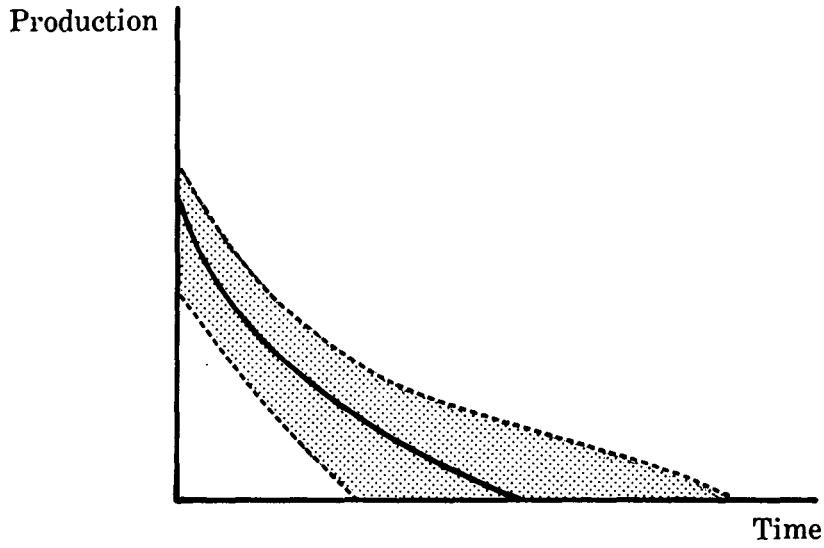
Figure 3, Cont'd



Since the life of a particular field usually runs between twenty and thirty years, price expectations are crucial in determining the extraction rate. In the previous analysis, it was assumed that these price paths were known with certainty. However, one of the major impacts of price controls, especially in recent years, has been to add uncertainty to the determination of the controlled price. The regulations outlined earlier have changed dramatically in just the last five years, and there is no reason for producers to expect any more certainty in the regulatory environment in the future. This instability is imposed on top of the uncertainty introduced by OPEC in their price-setting decisions. The combination of these factors could alter the analysis presented drastically. For example, if producers expected controls to be removed some time far in the future, and at the same time expect OPEC to raise prices rapidly, the profit-maximizing solution might be to withhold current production. While apparently this is not presently taking place, it is not difficult to conceive its occurrence in the future. Figure Four suggests how this uncertainty would alter any expected extraction path (a solid line) with a probability distribution (dotted lines) drawn about this line.

Figure 4

Production When the Controlled Price is Uncertain



The international implications of the dynamic analysis are somewhat similar to those of the static model presented above. The *demand* reaction to price controls in the dynamic and static solutions would be identical, however, the dynamic *production* decisions would tend to alter the position of OPEC. As long as slack OPEC production capacity exists, the dynamic solution would force the excess-capacity members of OPEC to alter their production in response to the extraction rates of the non-OPEC producers, in order to maintain the world oil price at the level they desire. If the spare OPEC production capacity disappeared, the dynamic production decisions of the non-OPEC producers would directly affect the world oil price and, therefore, add an additional variable in the profit-maximizing decisions of both the non-OPEC producers and of OPEC itself. Thus, controls can be seen not only to influence domestic decisions, but to impose significant costs on international markets.

Multinational Firms and the Development of the Iranian Oil Industry*

KARIM PAKRAVAN**

> Between late 1973 and early 1974, the foreign oil industry was subjected to revolutionary economic changes. Crude oil pricing decisions, traditionally initiated by the international oil companies, were taken over by the OPEC[1] members. . . . The OPEC members quadrupled the price of crude oil, and the OAPEC[2] members cut back production and put an embargo on shipments to the United States for political purposes. These actions set in motion radical changes in national energy policies, in international balance of payments, and in the role of multinational oil companies. The age of inexpensive oil and of market determination of petroleum prices and outputs had passed.[3]

The effects of the revolutionary decisions initiated by the oil producing countries in the early 1970's upon the OPEC members themselves were scarcely less profound than those felt by the oil consuming world. The hitherto exploited producing countries suddenly found in their hands not only a potentially destructive weapon in terms of joint pricing and producing decisions, but also opportunities to restructure their relationships with the multinational oil firms.[4] Iran took advantage of this opportunity, replacing the Iranian Consortium Agreement[5] with a long term supply contract that brought all oil operations in Iran under the direct control of the Iranian government through its agent, the NIOC.[6] This agreement, in con-

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* Editor's note: The reader will note that this article was written prior to the occurrence of the events which have recently transpired in Iran.

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1. Organization of Petroleum Exporting Countries.

2. Organization of Arab Petroleum Exporting Countries.

3. N. JACOBY, MULTINATIONAL OIL 301 (1974).

4. A multinational firm is one owning producing assets in at least two countries, and, in the case of the "Majors" (British Petroleum, Exxon, Shell, Gulf, Texaco, Mobil, Socal), many more than two countries.

5. Under the terms of the consortium agreement, the seven "Majors" participated in predetermined percentages: British Petroleum (40%), Royal Dutch Shell (14%), the five U. S. Majors (7% each), eleven independent oil companies, known as IRICON (5%), and the Companies Françaises des Pétroles (CFP) (6%) in exploration and production of all petroleum within the consortium area (100,000 square kilometers). The Iranian royalty was fixed at 12.5% of total revenue, and in addition, shared equally in net profits. The effect of the consortium in financial terms was enormous: an immediate tripling of Iran's per barrel revenue (from twenty-five to eighty cents per barrel).

6. National Iranian Oil Company. Under the supply contracts presently in effect, the NIOC sells petroleum to the consortium at a posted price per barrel, usually including a minor discount to the multinationals with whom Iran formerly dealt on a

junction with the joint venture contract,[7] (used primarily with independent oil companies), and the newer service contracts,[8] gives Iran unprecedented control over the production and sale of its oil.[9] However, Iran, just as all OPEC members, does not

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concession basis. The discount is partly used by the consortium to make loans to NIOC to cover its capital outlays. NIOC is presently renegotiating this purchase agreement because of its dissatisfaction with the consortium's performance, especially concerning the "minimum offtake program," whereby the consortium agreed to purchase a minimum amount every year.

7. Under the typical joint venture contract, the government acts in its sovereign capacity and as a partner in the venture. The joint venture pays taxes to the sovereign based upon a predetermined percentage of revenue (usually 50%). The government then, as a partner, again takes some 50% of the remaining profit with a result that the percentage of profit is 75%-25% in favor of the producing country.

8. The service contract is coming into increasing use throughout the world, but as yet there is no information available on the net benefits accruing under it to the host government. Under a service contract, the producing country bears the economic risk of discovery and owns all production assets. The multinational firm supplies the technical and managerial expertise of discovery, refining, and marketing for a fee, usually a percentage of the profit.

9. In a comparative analysis (using these variables: financial return to producing countries, national sovereignty, and conservation), it seems from available data that the joint venture regime is more favorable to the producing country than the concession regime, which was so widely used in the period from 1954-1973, principally in the consortium agreement.

While, as the following table suggests, the concession regime is slightly more favorable in terms of financial return,

Table 1

Per barrel disposable Revenue Received by Iran (cents per barrel)

Producer	1968	1969	1970	1971	1972	1973	1974
Consortium	80	83	123	133	164	860-960	
SIRIP	22	22	22	25	28	24	n.a.
IPAC	40	33	29	51	75	88	n.a.
IMINICO	—	24	31	39	66	106	n.a.
LAPCO	18	29	52	89	100	144	n.a.
NIOC	140	200	174	182	200	348	1336

the difference decreases as the price of oil increases. F. FESHARAKI, THE DEVELOPMENT OF THE IRANIAN OIL INDUSTRY (1976).

However, in terms of conservation, the joint venture regime appears clearly superior. Conservation may be defined as lower production and/or investment in order to maintain or increase capacity. Two indices that are useful in presenting the relative conservation efforts of the two regimes are the cumulative drilling-production ratio (CDPR) and the ultimate reserves-cumulative production ratio (URCPR). Generally, a higher CDPR will mean a greater effort in maintaining or increasing capacity, while a lower URCPR will mean a greater effort in conserving the resource through lower production. Although these indices have not been adjusted for any qualitative differences in the oil bearing fields, considering the fact that every oil region included belongs to the same oil basin, these indices do retain explanatory power.

yet possess the technical knowledge necessary to properly conduct all phases of oil production, from upstream to downstream activities.[10] The multinationals, on the other hand, possess a

Table 2

Cumulative Drilling-Production Ratio
(Meter/thousand cu. m)

	1960-73	1973-76
Consortium*	.57	.92
SIRIP	9.7	2.08
IPAC	3.32	3.24

Computed on the basis of NIOC annual reports 1960-76.
*OSCO after 1973.

This table indicates a better performance for the two joint ventures considered than for the consortium, even bearing in mind the superior quality of the consortium oil fields.

Table 3

Cumulative Production-Reserves Ratio

	Cumulative Production (million) bbls	Ultimate Proven Reserves (million) bbls	Cumulative Production Ultimate Reserves Ratio
Consortium	28084	80850	.34
IPAC	299	2457	.12
SIRIP	126	2113	.60
LAPCO	484	1500	.32

Based on a field compilation. Data reported in 1976.

The figure for LAPCO is lowered by the fact that it does not include ultimate reserves for Bahram field, for which no data is available.

Table three indicates a better performance for IPAC and SIRIP than the consortium and LAPCO in terms of a slower depletion of oil reserves.

Conservation is here considered of primary importance because effective resource management is essential to increase the life of the exhaustible oil supply, and thereby increase the transition phase from a world economy based on exhaustible fossil fuels to one based upon an inexhaustible source of energy, such as solar or geothermal energy. Such a lengthened transition phase is essential to help prevent the disastrous effects on the world economy that can be expected if the fossil fuels are too rapidly depleted.

10. Upstream activities consist of exploratory and development activities, such as geological and geophysical search activities, drilling of exploratory and development wells, and arranging the technical infrastructure. Midstream activities include the transportation of oil by pipeline and/or tanker ships. Downstream activities consist of refining and marketing.

virtual monopoly over this technical and managerial know-how. As such technology cannot practically be developed over the short run, Iran will continue to be dependent upon the multinationals to properly exploit its oil reserves. This necessitates a discussion of the proper role for the multinational oil firm in Iran on terms that will maximize the benefits to the producing country. In this connection, the following fields may be identified in which foreign operator assistance will continue to be necessary over the short run: provision of technology in upstream, midstream, and downstream operations, and the provision of capital. In what follows, each will be analyzed in turn.

I. PROVISION OF TECHNOLOGY

Given that foreign oil firms (and this includes independent as well as multinational oil firms) have a virtual monopoly on the technology of upstream, midstream, and downstream operations, as well as the fact that the development of such technology is a long and costly process, the solution for Iran would seem to include the purchase of technical services from foreign firms while simultaneously developing its own technology. The development of technology does not mean the importing or even building of, for example, drilling platforms, but furthering research and development that can expand on the existing Iranian technological base. Engaging in this course of action would require the creation of a general policy of fostering research and development through various incentives, especially incentives for private industry. This program in the long run will decrease reliance on foreign operators at all stages of the extraction process. This, in turn, will allow Iran to maximize the benefits from the exploitation of Iranian oil.[11] However, in the short run, the multinational oil firm will continue to play a large role in the various processes of developing the Iranian oil reserves. This role can be better understood by examining each step in the development process.

A. *Upstream Operations*

In the initial stage of geological and geothermal explora-

11. *See* Permanent Sovereignty Over Natural Resources, G.A. Res. 1803, 17 U.N. GAOR, Supp. (No. 17), U.N. Doc. A/5344 (1962). This resolution recognized that complete and permanent sovereignity over all natural resources rests with the people of the state in which such resources lie. This of course recognizes Iran's right to exploit its vast petroleum reserves for its own benefit.

tion, the crucial factor is the availability of trained personnel. The NIOC can therefore immediately take over all such activities, and simply procure the necessary human expertise.

The next step in the exploratory process is the drilling of exploratory and development wells. This does require sophisticated technology unavailable on a large scale. The international drilling industry is highly competitive and, therefore, quite cost efficient.[12] This invites, on at least a short and medium run basis, the purchase from the foreign operators of such services until the Iranian domestic drilling industry reaches a level of technological sophistication that will allow it to compete with foreign operations.

B. *Midstream Operations*

In the transportation of oil in pipelines, the construction

12. There is also significant evidence that prior to the drastic OPEC pricing decisions of 1973, the oil industry as a whole had begun to enter an era of freer competition. (*See, e.g.*, N. JACOBY, MULTINATIONAL OIL 299 (1974), for a view that crude oil prices had become essentially market-determined rather than supplier-announced, in the major consuming nations in the period from 1957-1973.) This can be seen from a presentation of the changes in the concentration of the foreign oil in industry in the period for 1953 to 1972:

Table 4

Summary of Changes in Concentration of the Foreign Oil Industry By Division, 1953 and 1972

Division of the Industry	1953		1972	
	"Seven Largest" Companies Combined (Percent)	All Other Companies Combined (Percent)	"Seven Largest" Companies Combined (Percent)	All Other Companies Combined (Percent)
Area of Operation	64	36	24	76
Proven Reserves	92	8	67	33
Production	78	13	71	29
Refining Capacity	73	27	49	51
Tanker Capacity	29	71	19	81
Product Marketing	72	28	54	46

Id.

However, the tendency of the foreign suppliers to control supply through a mechanism known as the Aggregated Programmed Quantity Agreement between the members of the Iran Consortium (that is, the seven Majors), as well as the tight control of marketing outlets by the majors may make such competition more illusory than real.

of the pipeline can be taken over in the long run by the domestic industry. However, until it becomes large enough to undertake such enormous projects, such construction projects will have to be contracted out to foreign construction firms. The actual naval transfer of petroleum is entirely another matter. The oil tanker business is becoming increasingly risky. Large fluctuations in tanker rates in the past year have been very burdensome both to shipbuilders and tanker fleet owners. There is, of course, the further risk of pollution of the marine environment by tankers. Given the strong competition in the international oil tanker business, as well as the enormous capital expenditures necessary to build a fleet, a more prudent policy would be to simply purchase necessary tanker services.

C. *Downstream Operations*

These operations, consisting of refining and marketing, require the greatest amounts of technical, financial, and managerial expertise. It is this facet of the oil development process that seems to be the most dependent upon foreign oil operatives. This supplies the foreign multinational oil firm offering such expertise a powerful lever in negotiating with producing countries. In this area, then, special emphasis in developing a domestic industry would seem to offer great benefits to Iran. This must be viewed in terms of development in the long run, as the tremendous financial and intellectual efforts required preclude short term development. Viable alternatives in the refining industry would seem to be (in additon to a gradual development of Iranian refineries), the purchase, in joint venture contracts, of refining services abroad, or simply to allow the crude oil to be refined abroad by the foreign multinationals, as is presently the case.

Marketing presents a more formidable challenge. Although by 1977, NIOC was exporting (marketing) directly 1,165 TBD,[13] this was mostly to Eastern Bloc and Third World Countries.[14] However, the traditional control of marketing and distribution by the Majors in the Western consuming countries has thus far prevented the development of large scale market-

13. Thousand barrels daily.

14. For instance, NIOC recently entered into joint ventures for refineries in both India and South Africa, as well as concluding barter deals with Brazil (oil for industrial and agricultural goods involving approximately one billion U.S. dollars) and various Comecon countries.

ing activities in such countries. It would appear to be a very risky and costly undertaking to attempt to preempt a share of this potentially vast market for Iranian oil. This is true not only due to the risks inherent in such an enterprise, but also because of the vast distribution structure that would have to be set up and staffed. While certainly possible and promising in the long run, in the immediate future, the multinational oil firm will continue to play the key role in the refining and marketing of crude oil.

II. PROVISION OF CAPITAL

The oil industry is capital intensive. This is true not only because of the tremendous amount of assets necessary to conduct even the most modest of operations, but also because the oil industry is entering an irreversibly increasing cost phase.[15] While Iranian oil revenues are high,[16] they are largely earmarked for domestic economic development. Thus, most of the required capital for further resource development must be provided by the international petroleum industry. The incentives necessary to attract the vast amounts of capital required can be included in the joint venture and long term supply contracts.

III. CONCLUSION

In the wake of the revolutionary economic changes wrought by the OPEC cartel action of 1973, oil producing countries as a whole are beginning to redefine their relationships

15. This is caused by the increasing difficulty of locating and extracting a scarce resource in an industry where the lowest cost oil fields (such as the one exploited by the Iran Consortium) are all but gone. The search for oil thus must lead to more offshore drilling and similar costly operations. Of course, world inflation also serves to increase cost. The following table graphically demonstrates the rapidly increasing investment per daily barrel, which is an index of the average cost of investment in capacity for the period 1972-1976.

Table 5

Investment per daily barrel
US $/daily barrel

	1973	1974	1975	1976
World	275	415	447	548
Middle East	40	46	52	94

16. Oil revenues for the OPEC countries in 1974 as a result of the pricing decisions were an additional $60 billion due the OPEC countries from the consuming nations, N. JACOBY, *supra* note 12, at 302 (1974).

with the multinational oil firms, who formerly controlled not only production, but pricing decisions as well. However, despite the new found control of production and pricing by oil producing countries, the very nature of the industry, (one requiring very sophisticated technical, financial, and managerial expertise) mandates a continued active role in the Middle East industry by the multinational oil firms possessing the necessary expertise.

Iran, over the long run, must work to maximize the benefits derivable from its vast oil reserves by developing its own technology, especially in the areas of upstream research and discovery and downstream marketing. This will require a vast national effort concentrating on expanding and enriching the existing Iranian base to include the necessary technical, managerial, and investment know-how needed to make Iran a full participant in the Middle East oil industry.

Nuclear Power Plant Siting: A Comparative Analysis of Public Interaction in the Siting Process in France and the United States

STEVEN A. CHRISTENSEN*

The world is rapidly depleting its energy reserves. When oil prices skyrocketed in November of 1973, as a result of the Arab oil embargo, alternative sources of energy were ardently sought. The oil embargo brought to the attention of millions what environmental groups have been telling us for years—natural resources are a finite commodity which we are expending at such a dangerously rapid rate, that if alternative energy sources are not developed immediately our present economic lifestyle may be short-lived.

The embargo poignantly reminded the United States and other industrialized nations of the degree to which they depend on foreign energy resources. This prompted President Nixon to implement new energy programs, demanding, among other things, that Americans conserve energy in order to help reduce our dependence on foreign oil.[1]

In recognition of the world's need for alternative energy sources, this paper will examine several nuclear power plant siting questions with a special focus on public concerns in both France and the United States.

Dr. Dixie Lee Ray, the former chairperson of the United States Atomic Energy Commission (AEC), stated in a speech to the European Nuclear Society that most opposition to nuclear power stems from fear.[2] This fear is a combination of both the known and unknown effects of the widespread use of nuclear power. From sickness and death caused by unseen radiation to fear of a major nuclear accident, the public is becoming acutely aware of the perils of the nuclear age. The public fear

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1. *See* Statement by the President Announcing a Series of Actions to Deal with the Energy Crisis, 9 WEEKLY COMP. PRES. DOC. 867 (June 29, 1973). *See also* President's Message to Congress, 119 CONG. REC. 12889 (1973).

2. A. LOVINS & J. PRICE, NON-NUCLEAR FUTURES: THE CASE FOR AN ETHICAL ENERGY STRATEGY xvii (1975) [hereinafter cited as A. LOVINS].

of nuclear power must be balanced against the needs of an industrial world for alternative energy sources.[3]

I. NUCLEAR POWER IN FRANCE

A. *History of Atomic Energy in France*

France's first encounter with atomic energy started in the laboratories of Henri Becquerel and Frédéric and Irène Joliot-Curie in 1934 with the discovery of artificial radioactivity.[4] In 1945, following World War II, there was official state recognition of the potentially peaceful uses of atomic energy.[5] Since October 1945, when Charles de Gaulle established the French Atomic Energy Commission,[6] successive French governments have followed a consistent energy program with two fundamental goals: (1) to provide energy at a minimal cost; and (2) to limit French dependence on foreign energy sources.[7] At the close of World War II, the French government nationalized the majority of the fundamental industries, including Electricité de France (EDF), which established a governmental monopoly over energy-related production.[8] The employment of nuclear reactors for major public and commercial use thus remains under governmental control and precludes nongovernmental ownership of nuclear facilities.[9]

EDF's initial nuclear energy project was the development of a natural uranium graphite-gas line of reactors.[10] In the 1960's, France realized that the graphite-gas line of reactors was outdated and thus decided to employ the American

3. Ralph Lapp, an environmental consultant to the Senate Public Works Committee, said that "the issue centers upon the nagging question about probability of a major nuclear accident . . . and . . . a modern industrial society demands power . . . . This means that sites will have to be found for these plants and there will have to be a balancing of risk and reward." D. BEHRMAN, SOLAR ENERGY: THE AWAKENING SCIENCE 10 (1976).

4. L. SCHEINMAN, ATOMIC ENERGY POLICY IN FRANCE UNDER THE FOURTH REPUBLIC 3 (1965) [hereinafter cited as L. SCHEINMAN].

5. *Id.* at 6.

6. Ordonnance 45-2563 of 18 Oct. 1945, [1945] J.O. 7065.

7. Dürr, *L'Énergie Nucléaire en France* 4, ELECTRICITÉ DE FRANCE (1978) [hereinafter cited as Dürr].

8. Loi 46-628 (Apr. 8, 1946) [1946] J.O. 2951.

9. *See* Grzybowski & Dobishinski, *Property and Tort in Nuclear Law Today*, 10 VAND. J. TRANSNAT'L L. 446 (1977).

10. Dürr, *supra* note 7, at 5. This type of reactor was chosen because, during the postwar period, France did not want to become dependent on foreign nations for her development and the fuel needed for this type of reactor was readily available in France. *Id.* at 4-5.

Pressurized-Water-Reactor (PWR).[11] Export possibilities in the early seventies were a crucial factor in this decision.[12] Then, shortly after the 1973 oil embargo, the French government decided to accelerate its nuclear energy program. In order to bring the French nuclear industry under exclusive government control, the *Commissariat à l'Énergie Atomique* (CEA) was authorized to buy back a portion of Westinghouse's interest in Franatom.[13]

B. *Structure of the CEA*

After the nationalization of her primary industries, France's desire to become one of the leading postwar powers led President de Gaulle to form, under the Atomic Energy Commission, the *Commissariat à l'Énergie Atomique.*[14] The CEA, a scientific establishment vested with a civil personality and a somewhat unique administrative and financial autonomy, was placed under the control of the President of the Provisional Government.[15] Its main purpose, according to the enabling ordinance, was to research the practical applications of atomic energy.[16] The organization was subsequently modified, and now the CEA is under the direct authority and control of the Prime Minister.[17] Beneath the Prime Minister are: (1) the Administrator-General who acts as both the administrative director of the CEA, and as the official spokesman and delegate of the French Government;[18] and (2) the High-Commissioner who controls the scientific and technical aspects of the agency.[19]

C. *France and Euratom*

Late in 1957, the European Atomic Energy Community (Euratom) was created upon the signing of the Treaty of Rome.[20] The Euratom Treaty created an international commis-

11. *Id.* at 8-9.

12. *Id.* at 11. Franatom obtained the requisite licenses from Westinghouse for PWR construction and Sogerca was licensed by General Electric for production of Boiling-Water-Reactors (BWR).

13. *Id.* at 12.

14. Ordonnance 45-2563 of 18 Oct. 1945, art. 1, [1945] J.O. 7065.

15. *Id.* The administrative functions of a traditional French public institution are delegated to one of the government ministers in the executive branch. *See also,* L. SCHEINMAN, *supra* note 4, at 9.

16. Ordonnance 45-2563 of 18 Oct. 1945, [1945] J.O. 7065.

17. L. SCHEINMAN, *supra* note 4, at 11.

18. Ordonnance 45-2563 of 18 Oct. 1945, art. 2, [1945] J.O. 7065.

19. *Id.* at art. 3. *See generally,* 2 ASPECTS DU DROIT DE L'ÉNERGIE ATOMIQUE 68 (H. Puget ed. 1967) [hereinafter cited as H. Puget].

20. Treaty Establishing the European Atomic Energy Community, [1958] 298

sion which was to supersede national legislation in this area in order to maximize the management and exploitation of nuclear energy and materials in Europe. In spite of conflicting political and institutional ideologies, the Six generally agreed that Euratom should be vested with: (1) the right to stock fissionable materials; (2) the power to create and manage common institutions;[21] (3) the coordination of research and planning; and (4) the right to open the market for nuclear materials and equipment.[22]

Euratom threatened France's desire to remain a major postwar power. French atomic development was far superior to that of its potential partners, and France feared a loss of control over her vital resources.[23] It was not until France was assured that she alone would have control over her atomic military rights that she assented to the Euratom Agreement.[24]

D. *French Legislation in the Nuclear Field*

1. *Base Installations*

Government intervention and regulation of the nuclear energy industry are a direct result of the potential public hazards of nuclear materials. The French Government, by means of *Décret* 63-1228 of December 11, 1963 (Decree of 1963), specifies legislative requirements for "basic nuclear installations."[25] The legislation establishes strict conditions which a base nuclear installation must satisfy before proper authorization for construction can be granted.[26]

2. *The Decision Processes*

The owner-operator of a nuclear facility must submit a

U.N.T.S. 169. The treaty was signed by the original "Six" nations of the EEC: France, Belgium, Germany, Italy, Luxembourg, and the Netherlands.

21. *Id.* at art. 86. Under the Euratom Treaty, the Community became the legal owner of all special nuclear materials produced by the member nations. *See also,* Smith, *The European Atomic Energy Community: The Limits of Supernationalism,* 1 CAL. W. L. REV. 33 (1970). The control and management of these institutions rests on the degree of commitment from the individual countries. The Euratom Treaty sanctions the inspection and control of nuclear facilities as a safety measure against the manufacture of nuclear weapons. *Id.* at 37.

22. [1958] 298 U.N.T.S. 169.

23. L. SCHEINMAN, *supra* note 4, at 144-45.

24. *Id.* at 166.

25. Décret 63-1228 of Dec. 11, 1963, [1963] J.O. 11092, modified in part on March 27, 1973. These regulations place the *more important* installations, from planning through functioning, under diverse controls. *See* Bourgeois, *Nuclear Installation Safety* 18, ELECTRICITÉ DE FRANCE (1978) [hereinafter cited as Bourgeois].

26. *Id.* at art. 3.

series of safety reports to the various administrative offices in charge of granting construction permits before a license to operate can be granted. The first of these reports is the preliminary report, which is submitted to the Minister of Industry, and enumerates the safety measures to be taken by the owner-operator.[27] Next, the provisional report is submitted to the Inter-Ministerial Committee for Basic Nuclear Installations (CIINB) which predicts the performance of the unit as a whole and of its various safeguard components.[28] Then the final report is submitted to the CIINB after all tests have been completed, and specifies the actual measured performance of the unit.[29]

An independent agency is required to examine the proposed safety standards to guard against the possible bias of reports submitted by owner-operators, and to determine the advisability of granting a license.[30] The proposal must then be reviewed and approved by several government officials before the Prime Minister finally authorizes the nuclear installation.[31] A draft proposal is passed, in the following order, from the Institute for Health, Physics, and Nuclear Safety,[32] to the Standing Groups,[33] to the Minister of Health, to the Minister of Industry, to the CIINB, and to the Ministers in charge of that particular type of nuclear installation for final review.[34]

The request for authorization to build a nuclear installa-

27. Bourgeois, *supra* note 25, at 35. The preliminary reports generally include the proposed actions of the owner-operators concerning general safety principles, main technical safety options, design studies, and a preliminary safety study.

28. *Id.*

29. *Id.*

30. *Id.* The safety reports are sent to a Standing Group of experts who review the material and then make a proposal, for or against the facility, to the Central Service for Nuclear Installation Safety.

31. *Id.* at 39.

32. *Id.* at 36. This administrative body was formed in November 1976, by a joint order from the Minister of Industry and Research and the Minister of Economy and Finance. The institute's primary function is to perform studies, research, and works on physics and nuclear safety. It must also assist and advise the Ministers on CEA matters.

33. *Id.* at 37. The Standing Groups are divided into three catagories: the first group is in charge of nuclear reactors, the second group is in charge of particle accelerator safety, and the third group is in charge of other nuclear installations (such as reprocessing plants). The Standing Group in charge of a particular institution will evaluate and combine the safety reports submitted by the Institute for Health, Physics, and Nuclear Safety. The experts will add any technical specifications which they deem necessary, and the owner-operator must comply with these specifications.

34. *Id.* at 39.

tion[35] must contain: (1) the characteristics of the installation; (2) a descriptive notice of the geographic region and the reason for the site choice; (3) potential environmental effects; (4) proposed control of the nuclear materials; and (5) security precautions.[36] Before the administrative functions are complete, the public must be given an opportunity to express their views of the project and of the location of the installation.[37]

E. *Environmental Protection*

Article 1 of the law of July 10, 1976, requires that an impact study on the environment and the region surrounding the proposed site be made each time an operating license is considered.[38] The purpose of the impact study is to systematically determine the effects of a nuclear facility on the environment, as well as on the local population.[39] It is the responsibility of the owner-operator applicant, public or private, to conduct all necessary impact studies.[40]

Once the impact study is completed, a hearing is held to familiarize the public with the new installation and to receive feedback from interested citizens.[41] Hopefully, public scrutiny will insure an objective, high quality, impact study. Publicity for the hearing must be paid by the applicant, while the breadth of publicity is determined by the regional prefect.[42]

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35. *See* Decree of March 27, 1973, arts. 3 and 6 bis.

36. DÉLÉGATION GÉNÉRALE À L'ÉNERGIE, L'ÉNERGIE NUCLÉAIRE: LE PROJET SUPERPHÉNIX À CREYS-MALVILLE 27 (1977) [hereinafter cited as DÉLÉGATION GÉNÉRALE À L'ÉNERGIE].

37. *Id. See also* Décret 63-1228, art. 8, (Dec. 11, 1963) [1963] J.O. 11093. Under the provisions of article 8, the Commission must answer, within three months, an inquiry into the licensing of a particular installation. The article mandates that the purpose of the prescriptions is to avert all public danger and inconvenience.

38. Loi 76-629 (July 10, 1976) [1976] J.O. 4203, modified by Décret 77-1141 (Oct. 12, 1977) [1977] J.O. 4948.

39. Décret 77-1141, arts. 1 & 2, (Oct. 12, 1977) [1977] J.O. 4948. The impact study should report the initial condition of the site, including agriculture, forests, marine life, and so forth. The study should also include probable effects on the environment and population if a nuclear facility is to be located on the site.

40. Décret 77-1131, art. 3, clause 4 (Sept. 21, 1977) [1977] J.O. 4849.

41. *Id.* at art. 5. When the applicant's dossier is complete, the prefect of the region reviews the findings, and if all requisites have been met, he will order a public hearing.

42. *Id.* at art. 6. Public notices must be posted in all communities and areas which will be affected by the facility. Eight days before the hearing adequate notice must be given in the local or regional newspapers and, if the prefect deems it necessary, he may require the sponsor to employ other means of communication.

The impact study and public hearings are designed to include the public in the decisionmaking process at an early stage, so information about fundamental issues, particularly environmental quality and public protection, must be available to all interested parties. The public recommendations are included in the licensing proposal.

F. *Safety Concerns*

According to the Decree of 1963, those installations which cause inconvenience or endanger the public are placed under the surveillance of administrative authorities.[43] These facilities are divided into three classes according to the gravity of potential danger or inconvenience inherent in their exploitation.[44] Although atomic research and the construction of reactors and laboratories are under the direction and control of the CEA, France has public organizations, outside the control of the CEA, such as *les Amis de la Terre* (Friends of the Earth), which perform an important function in the nuclear industry. These organizations usually act under either the *loi du 19 décembre 1917* (the Law of 1917) which regulates dangerous establishments, or under the Decree of 1963 which controls potential public hazards.[45]

Under French regulatory law, only the operator of a nuclear installation may receive a construction permit. When all other necessary licenses have been obtained, the operator becomes responsible for the safety of the installation.[46] Minimum safety standards are established by the Minister of Industry, Trades, and Crafts.[47] This ministry controls the Central Service for the Safety of Nuclear Installations (SCSIN), a group of experts who study the technical problems associated with creating, servicing, and shutting down nuclear facilities.[48]

Article 11 of the Decree of 1963 requires two types of inspectors at all primary nuclear installations.[49] The first kind

43. H. Puget, *supra* note 19, at 22.

44. *Id.*

45. *Id.* at 23.

46. Torquat, *L'Organisation des Pouvoirs en France dans le Domaine de la Sureté Nucléaire* 4, ELECTRICITÉ DE FRANCE (1978) [hereinafter cited as Torquat].

47. *Id.* at 5.

48. DÉLÉGATION GÉNÉRALE À L'ÉNERGIE, *supra* note 36, at 27. SCSIN is concerned with the licensing of the facility, and with the general preparation and enforcement of technical specifications concerning the safety of the installation.

49. Décret 63-1228, art. 11, (Dec. 11, 1963) [1963] J.O. 11093.

of inspector falls under the purview of the Law of 1917, and is charged with the regulation of primary nuclear installations.[50] Inspectors of the second type are agents of the *Service Central de Protection contre les Rayonnements Ionisants* (SCPRI). Their function is to monitor the radioactive pollutants and to control the effect of pollutants outside of the installation, with special emphasis on protection of the public health and safety.[51]

The public is further protected by the *Décret 75-713 du 4 août, 1975* (Decree of 1975) which establishes an Inter-Ministerial Commission for Nuclear Security.[52] This commission is responsible for protecting persons and their property against nuisances and dangers from the creation, functioning, or shutdown of nuclear facilities.[53] France employs "barrier analysis" in its safety study of reactors. Barrier analysis entails a study of the reactor once it has been completed, and can be used on any reactor-type.[54] This independent approach stresses safety precautions which must be taken to prevent accidents, and defers until the end of the analysis the review of the reactor's emergency devices.[55]

G. *Liability and Damages*

The owner-operator of a nuclear facility is responsible for the safety aspects of its operations, and is absolutely liable for any damages caused by a nuclear reactor, as set forth by the 1960 Paris Convention.[56] The maximum liability of the operator is 50 million francs per accident, regardless of the number of facilities on that site.[57] The French Government is liable for amounts not covered by the operator's insurance, up to a maxi-

50. *Id.*

51. *Id.*

52. Décret 75-713 (Aug. 4, 1975) [1975] J.O. 8116.

53. *Id.*

54. Bourgeois, *supra* note 25, at 27.

55. *Id.* Each reactor has 3-4 tight barriers: (1) the cladding; (2) the primary system boundary; (3) the primary; and (4) secondary containment barriers. Each barrier is analyzed for: (1) normal operating conditions; (2) normal transients (start-ups, power raising, load variations); and (3) accident transients. *Id.* at 28-29.

56. Convention on Third Party Liability in the Field of Nuclear Energy, July 29, 1960, art. 3, 55 AM. J. INT'L L. 1082 (1961). Although article 3 indicates that the operator is absolutely liable, article 9 states that if the damage is caused by unforeseeable civil conflicts, civil war, or catastrophic disasters, the operator will not be held accountable.

57. Loi 68-943, art. 4 (Oct. 30, 1968) [1968] J.O. 10195.

mum of 600 million francs.[58] However, the government is liable only after the operator has paid the full 50 million franc minimum deductible.

Anxiety about potential nuclear hazards, accompanied by the construction and operation of the world's largest commercial breeder reactor, the Super-Phénix, has caused concern in the environs of Creys-Malville where the facility is located.[59] The Super-Phénix is a joint energy program, controlled by the French Government and operated by the *Centrale Nucléaire Européene à Neutrons Rapides, S.A.* (NERSA) organization.[60] In full operation, the Super-Phénix will produce 1200 megawatts of electricity from its first five tons of plutonium. This large amount of plutonium explains the overwhelming public interest in the Super-Phénix installation.[61] The project was initiated in January of 1973, after which public meetings and debates were organized between antinuclear groups, environmentalists, agricultural concerns, and the proponents of the project.[62] Once the debates and studies were finished, the project was approved and work commenced in the spring of 1977.[63]

H. *Public Action in Nuclear Power Plant Siting*

Recent surveys in France indicate that since 1974, when over three-fourths of the population was in favor of nuclear energy, the number of nuclear proponents has plunged by

58. *Id.* at art. 5. *See also* Brussels Supplementary Convention, 2 INT'L LEGAL MATERIALS 685 (1963). Under the Brussels agreement, the signatories indicated a willingness to contribute to a maximum recovery of $120 million, but only after the individual insurance and the home state have contributed their shares.

59. Residents of the area have stated that they do not want to be the guinea pigs for the world's first operational breeder reactor. They feel that there are simply too many unknown factors, and no one knows exactly what may happen. L'EXPRESS, Aug. 8, 1977, at 28.

60. Centrale Nucléaire Européenne à Neutrons Rapides, S.A. This group was formed and controlled by France (EDF) which held a 51% interest. France was joined by Italy (ENEL) with 33%, Germany (RWE) with 16%, and small interests are owned by Belgium, Holland, and Great Britain. DÉLÉGATION GÉNÉRALE À L'ÉNERGIE, *supra* note 36, at 19.

61. L'EXPRESS, April 17, 1978, at 78. The opponents of the Super-Phénix are quick to point out that it only takes six kilos of plutonium to create an atomic bomb. Five tons of plutonium, which is one of the most toxic and enduring radioactive elements known to man, presents the danger of an explosion never before paralleled. There are also dangers ranging from the possibility of small leakages of radioactive effulgents to the possibility of terrorist attacks. *Id.*

62. DÉLÉGATION GÉNÉRALE À L'ÉNERGIE, *supra* note 36, at 42.

63. Dürr, *supra* note 7, at 15.

about twenty-five percent.[64] Antinuclear forces, especially the ecology groups, are a major reason for this decline. In the municipal elections of 1977, for example, the ecology groups created so much friction that the campaign focused almost entirely on ecological issues.[65]

The results of these elections show that ecology groups, such as *les Amis de la Terre* and *les Groupes Scientifiques pour l'Information sur l'Energie Nucléaire*, are becoming a significant power in the political arena.[66] Not only have elections been won or lost because of the "green vote," but the pressure they exert has also created new legislation which allows for the protection of the environment as well as providing the legal means by which these groups can exercise their rights.[67]

A renewed vigor was witnessed by these antinuclear factions when the French Government reemphasized its atomic energy programs and proposed to build at least forty conventional nuclear plants and one breeder reactor at Creys-Malville.[68] Demonstrations in France against atomic power plants have been relatively peaceful. However, during the protest against the Super-Phénix in the summer of 1977, violence marred the demonstration.[69] The demonstration at Creys-Malville had been planned for several months and nonviolence was stressed so successfully that many local politicians agreed to participate.[70] René Jannin, the prefect of the department in which Creys-Malville is located, stated afterward, "we made several tactical errors." Sufficient safety precautions were not taken.[71] Although German demonstrators have been more prone to violence, demonstrators now come from all over Europe and violence appears to have increased.[72]

The majority of participants at the Creys-Malville demonstration belonged to environmental groups and were not inter-

64. Sweet, *The Opposition to Nuclear Power in Europe*, BULL. ATOM. SCI. 41, 44 (Dec. 1977) [hereinafter cited as Sweet].

65. Sansen, *Le Mouvement Ecologique Français*, 2 RÉV. GÉNÉRALE NUCLEAIRE 3 (1977).

66. *Id.*

67. *See generally* Décret 77-760 (July 7, 1977) [1977] J.O. 3663.

68. TIME, Aug. 15, 1977, at 31.

69. L'EXPRESS, Aug. 8, 1977, at 23, 25.

70. *Id.* at 25.

71. *Id.*

72. Sweet, *supra* note 64, at 43.

ested in a violent demonstration. However, as the date of the protest approached, there were many who came solely for a violent demonstration against the "system." These dissenters were able to persuade the pacifists that their previous attempts to stop or change nuclear policy had been entirely futile and that the time had come for more forceful measures in these matters.[73]

The concern of both individuals and interest groups in nuclear power and the protection of the environment has caused the Government to delineate the necessary steps for increased public participation.[74] The Government has also indicated a desire to have more individuals participate in matters that will directly affect their life or lifestyle.

I. *Conclusion*

Although the French Government recognizes the utility of nuclear energy and the possibilities it presents for the future through breeder reactors, other "new energies" are ardently being explored.[75] The National Center for Scientific Research, for example, is one of the world's leading government institutions in the development of solar energy.[76] As the public and government become more aware of the problems in this area, new legislative measures are created to promote equitable solutions.

Since France has negligible oil reserves, very little coal, and no other visible energy possibilities at present, it appears that the development of nuclear energy is inevitable. The extent to which demonstrations and public attitudes are able to change French legislation, and/or stop further development of nuclear power, appears limited. Whether or not a scientific breakthrough will allow France to switch completely to solar, wind, or other "new energies" can be seen only in the future. Presently, France is aware that without nuclear power massive

73. L'EXPRESS, Aug. 8, 1977, at 28.

74. Décret 77-760, art. 6-8, (July 7, 1977) [1977] J.O. 3663. *See also* Circulaire of Jan. 10, 1977, [1977] J.O. ____.

75. As of May 1978, nuclear energy provided 12% of France's electricity. France's 1985 nuclear energy goal has been set at 20%. Le Monde, May 2, 1978.

76. DÉLÉGATION AUX ÉNERGIES NOUVELLES, SOLAR ENERGY FROM FRANCE 22 (1977). France has a solar furnace at Odeillo-Font-Romeu which is fed by sixty-three flat mirrors and can reach a temperature of 3,800°C. There are also several apartment buildings around France, sponsored by CNRS, which are entirely heated by solar energy.

amounts of foreign energy must be purchased. Given the French spirit of independence, it is doubtful that France would ever subject herself to the manipulations of energy-producing nations if French controlled nuclear power were available.

II. NUCLEAR ENERGY IN THE UNITED STATES

A. *History*

Shortly after World War II, the United States created the Atomic Energy Commission (AEC) and monopolized the nuclear energy field through the passage of the Atomic Energy Act of 1946.[77] This act was soon replaced by the Atomic Energy Act of 1954 which substantially limited the governmental monopoly of the nuclear field.[78] Although the 1954 Act invited more participation from private sectors, the nuclear energy field was slow to develop, due initially to the low cost of alternative energy sources.

Change came with the Energy Reorganization Act of 1974, which abolished the AEC and divided its duties between the newly formed Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA).[79] Regulation and supervision of the construction, maintenance, licensing, and operation of nuclear power facilities within the United States was delegated directly to the NRC. The NRC has divided the licensing process into two steps: (1) a construction permit for the proposed nuclear reactor;[80] and (2) a license to operate the facility after the reports have been filed and the surveys taken.[81] ERDA's functions are to coordinate Federal

77. Atomic Energy Act of 1946, 60 Stat. 755 (1946) [codified at 42 U.S.C. §§ 2011-2296 (1976)].

78. Atomic Energy Act of 1954, ch. 1073, 68 Stat. 921 (1954) [codified at 42 U.S.C. §§ 2011-2296 (1976)]. Prior to the 1954 Act, private ownership, manufacture, or operation of a nuclear facility was prohibited, as the entire field was under the exclusive jurisdiction of the Federal Government. The passage of the 1954 Act invited public participation in the nuclear field. However, the government retained absolute control over nuclear fuels which were to be leased from the government. (This is set forth in 42 U.S.C. § 2061 (1978) which provides that the Commission shall be the exclusive owner of all production facilities except: (1) those dealing with research and development, which do not make enough fuel for atomic weapons; and (2) those licensed by the Commission pursuant to §§ 2133-2134 of the Act.)

79. Energy Reorganization Act of 1974, 42 U.S.C. § 5801 (1976).

80. 42 U.S.C. § 2239(a) (1976). Construction permits are granted only after all relevant siting criteria, environmental impact statements, and public notices of hearing requirements have been met. *See also* 10 C.F.R. § 50.34(b) (1978).

81. 42 U.S.C. § 2239(a) (1976).

activities relating to research and development of various energy sources.

B. *Preemption*

Numerous cases have arisen disputing the NRC's apparent exclusive control over the licensing process, in effect, preempting a state's action on matters within its own domain.[82] The preemption doctrine, which was first enunciated in *Gibbons v. Odgen,*[83] allows Federal regulations to take exclusive precedence over similar state regulations, with the exception of state regulations that pose no direct conflict, or those which Congress has not unequivocally declared preempted by Federal legislation.

Although the preemption doctrine has survived many years of Supreme Court rulings, it has not been adequately defined. Individual courts have maintained the power to construe state regulatory statutes according to the particular facts of the case,[84] and it was not until *Northern States Power Co. v. Minnesota*[85] that the question of preemption in the atomic energy area was decided.

The Atomic Energy Act of 1954 gave the Federal government exclusive jurisdiction and control over the regulation of *all* radiation-related hazards in the nuclear field. These joint judicial and administrative rulings had the effect of totally preempting the state government from making any independent judgments on health and safety issues.[86] Then, in 1959, an amendment to the Atomic Energy Act of 1954 created a major provision which granted authority to each state to regulate the nonradiation hazards within its own territory. The amendment provided that, "nothing in this action shall be construed to affect the authority of any state or local agency to regulate activities for purposes other than protection against radiation."[87] This allowed states to participate more meaning-

82. Northern States Power Co. v. Minnesota, 447 F.2d 1143 (8th Cir. 1971). *See generally* Yates, *Preemption Under the Atomic Energy Act of 1954: Permissible State Regulation of Nuclear Facilities Location, Transportation of Radioactive Materials and Radioactive Waste Disposal,* 11 TULSA L. J. 397 (1976).

83. 22 U.S. (9 Wheat.) (1824).

84. *See* City of Burbank v. Lockheed Air Terminal, Inc., 411 U.S. 624 (1974).

85. 447 F.2d 1143 (8th Cir. 1971).

86. Public Interest Research Group of New Jersey, Inc. v. New Jersey Dep't of Environmental Protection, 377 A.2d 915, 928 (1977).

87. 42 U.S.C. § 2021(k) (1976). In order to participate in a formal determination

fully in the siting process of nuclear facilities, and thus negated complete domination by Federal agencies.

Judge Van Oosterhout, in his dissenting opinion in *Northern States*, spoke out strongly against the notion of Federal preemption in this area.[88] He noted that there had been no apparent congressional intent to preempt this field; otherwise, Congress would have stated it explicitly in statutes or in their hearings on nuclear energy.[89]

C. *Environmental Aspects of the Licensing and Siting Process*

The NRC is not solely responsible for the licensing and siting process at the Federal level. In the often-cited case of *Claverts Cliffs Coordinating Commission v. United States Atomic Energy Commission*,[90] the requisite duties of the licensing process, as set forth in the National Environmental Policy Act (NEPA), are analyzed in detail.[91] *Calverts Cliffs* pointed out that NEPA was created to establish "environmental protection as an integral part of the AEC's basic mandate . . . and it must itself take the initiative of considering environmental values at every distinctive and comprehensive stage of the process beyond the staff's evaluation and recommendation."[92] However, as broad as this construction may appear, it did not give an unlimited grant of power to NEPA.[93]

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of a nuclear facility siting, the state representative must request a formal hearing before the Licensing Board as an interested party under 10 C.F.R. § 2.714 (1978).

88. 447 F.2d 1143, 1155 (8th Cir. 1971). "The Supreme Court has uniformly recognized the legislative intent of the state in its laws designed to protect the health and safety of its citizens and has refused to find federal-preemption over state health and safety laws, absent a clear and unmistakeable showing of an intent on the part of Congress to preempt." *Id.*

89. *Id.* at 1157. "There is nothing in the statutes which expresses a clear Congressional intent to prohibit the states from taking additional steps deemed necessary to control air, water and pollution. . . . The language of a statute controls over the legislative history, which is often ambigious. Congress was aware of the problem and could have solved it readily by incorporating appropriate language in the Act. It refused to do so." *Id.*

90. Calverts Cliffs Coordinating Comm'n v. United States Atomic Energy Comm'n, 449 F.2d 1109 (D.C. Cir. 1971).

91. *Id.* at 1112. Under this section, NEPA is not permitted, but rather is compelled, to take environmental values into consideration.

92. *Id.* at 1119.

93. [1977] NUCLEAR REG. REP. (CCH) ¶ 30,172.02. NEPA does not require an unbalanced weighting of the environmental issues over other factors, such as economic, or health and safety advantages. The purpose of NEPA is to insure that the agencies give appropriate consideration to the environmental factors in the decision process, but

Recent decisions have taken the approach of Judge Van Oosterhout in granting more power to the states and to local environmental groups while curtailing NRC's "exclusive" powers. An example in this shift of control can be seen in the recent Clean Air Act, which transferred the authority to regulate the radioactive effluents from nuclear power installations from NRC to the Environmental Protection Agency (EPA).[94]

Under the new Act, emission limitations may be enforced by citizen groups as well as by state and local governments. The Act permits the state to adopt air quality standards which are more stringent than those imposed by the Federal government. This includes control over radioactive pollutants, and thus overrules that aspect of the *Northern States* decision. The Clean Air Act also requires the EPA to determine, by August 7, 1979, whether the emission of radioactive pollutants at the various sites will endanger public health. If the EPA determination is affirmative, the radioactive pollutants will continue to be under EPA control pursuant to the Clean Air Act.[95]

D. *Present Siting and Licensing Requirements*

1. *Application Process*

A license to construct or operate a nuclear facility is considered only upon completion of the application form. This application must be presented at a public hearing before the AEC, and section 189(a) of the Atomic Energy Act requires that a Notice of Hearing on Application for Construction Permits be printed in the Federal Register thirty days prior to the hearing. The application must also include safety assessments and a description of the site, an evaluation of the design and of the performance of the structures,[96] and, finally, a safety analysis report.[97]

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the environmental protection aspect was not established as the exclusive goal.

94. Clean Air Act Amendments of 1977, 42 U.S.C.A. § 7401 (1978). It should be noted that the NRC maintained the responsibility for prescribing limits, and implementing and enforcing the EPA's radiation standards.

95. *Id.* Before EPA lists the source of the pollutant, it must first consult with the NRC and, no later than six months after the listing, the two agencies must agree to procedures which will minimize a duplication of their efforts with regard to the regulation of the polluting emmissions.

96. 10 C.F.R. § 50.34(a)(1) (1978). Such assessments shall contain an analysis and evaluation of the major structures, systems, and components of the facility.

97. *Id.* at (b). The safety analysis report must include information which describes the facility, and which presents a safety analysis of the structure, systems, compo-

2. *Review Process*

First of all, the NRC staff scrutinizes the health, safety, and environmental aspects of the application, and then drafts an environmental impact statement. Public comments must accompany both the application and environmental impact statement to insure increased public participation.[98] Next, the Advisory Commission on Reactor Safety (ACRS) must examine the design of each plant to eliminate possible safety hazards. After the ACRS report is submitted to the Commission, a public hearing is scheduled. Thirty days notice is required, and must be printed in the Federal Register.[99]

To increase public involvement and improve community relations, the Commission has permitted intervenors into the licensing process on the following grounds: (1) if they can show an independent injury or, basically, if they can meet judicial standing requirements; (2) if they live in the immediate vicinity of the proposed facility; or (3) if the Commission feels that they can significantly contribute to the licensing process.[100]

The nuclear installation siting process is one of the most time consuming aspects of the nuclear development program. In an effort to speed up this process, Appendix Q to 10 C.F.R. 50 was passed in 1977 to grant the right to request an early site review to any individual or group.[101] However, these reviews are subject to public interest considerations and are not conclusive until all vital information has been confirmed.[102] Further, the application for early site approval, if accompanied by a construction permit, will only be effective for a five-year period, with an additional one-year extension when good cause is shown.[103]

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nents, and the facility as a whole. All current information must be included, such as results of environmental studies, meteorological monitoring programs, etc.

98. 10 C.F.R. § 51.26 (1978).

99. 10 C.F.R. § 50.58 (1978).

100. The Atomic Energy Act does not mandate public hearings. However, such participation at an early stage can generate confidence in the Commission, and potentially will cut down the amount of time necessary for subsequent public hearings which may be required by law.

101. 42 Fed. Reg. 22,882 (1977).

102. *Id.*

103. *Id.* This new provision will allow any person, state, or other entity to request a review of the site suitability issues. However, there will be no issuance of a partial decision concerning the site unless the request for review is made during the construction permit proceedings. *Id.* at 22,887.

As in France, hearings are conducted by nuclear siting experts because of the technical nature of the issues involved.[104] However, interested individuals may participate in these hearings by filing a petition to intervene pursuant to 10 C.F.R. section 2.714 (1978).[105]

3. *Specific Siting Criteria*

Public involvement in the energy field has two major objectives: (1) to make certain that the facilities are as safe as possible; and (2) to place the facility in someone else's vicinity, if at all possible. The possibility of a major nuclear accident, coupled with the probability of serious problems caused by radioactive pollution and waste control, makes the correct siting of a nuclear installation imperative. To aid in the location of facility sites, the NRC has come up with several evaluation considerations.[106]

The major factors to be considered are population density,[107] meteorological conditions of the site environs, the intended use of the reactor, the unique qualities of the particular units, and geological configurations.[108] When more than one reactor is proposed for a nuclear power center, assessments should also include:

> A regional evaluation of natural resources, including land, air, and water resources, available for use in connection with nuclear energy sites; estimates of future electrical power requirements . . . economic impact at each nuclear energy site; and consideration of any other relevant factors, including but not limited to population distribution, proximity to electric load centers and to other elements of the fuel cycle. . . .[109]

These NRC siting criteria are flexible and were not intended

104. 42 U.S.C. § 2239 (1976).

105. 10 C.F.R. § 2.714 (1978). The petitioner must specifically identify those aspects of the application to which he is opposed, and must indicate his interest in the proceedings and the basis for his contention in a petition.

106. 10 C.F.R. § 100.10 (1978).

107. *Id.* at § 110.3(b). Population density includes the exclusion areas and low population zones. The exclusion area, as defined in section 100.3, is that area immediately surrounding the reactor in which the licensee has authority to determine all activities, including the exclusion of personnel and property. The low population zone immediately surrounds the exclusion area, and its limited population allows appropriate protective measures to be taken on its behalf in the event of a serious accident.

108. 10 C.F.R. § 100 app. A (1978). Important considerations in this area are the probability of earthquakes, tornadoes, hurricanes, floods, and tsunami which could result in a failure of the facility's functions.

109. 42 U.S.C. § 5847 (1976).

to be the final word in all situations. For instance, theoretically there can be no minimum or maximum size for an acceptable exclusion area; characteristics of the specific area will determine how large or small the exclusion area should be. However, the area must be large enough so that an individual located on its boundary would not, in the event of a postulated accident, receive a radiation dose in excess of the safe minimum as established by the NRC.[110]

E. *Liability Aspects of Nuclear Power Station Siting*

Human safety has been the primary reason for establishing a large exclusion area, but the potential liability for numerous types of possible accidents has also been a prime consideration. In fact, it was the basic reason for the slow development of private nuclear enterprise in the United States. Given the potential liability for a nuclear mishap, it was apparent that if Federal protection or subsidies were not provided, the public sector might never get involved in the nuclear energy industry. Thus, Congress passed the Price-Anderson Act of 1957,[111] which placed a ceiling on the amount of damages that could be recovered in any one incident.

The AEC now demands proof that the operator possesses, and will maintain, adequate financial protection as set forth by the Commission.[112] The Commission may also require that the applicant waive any immunity from public liability conferred by Federal or state laws.[113] Before 1975, liability was limited to $560 million. As in France, the operator of a nuclear facility in the United States must carry enough insurance to cover potential operational liabilities. However, in the U.S., coverage must also extend to third party liability.[114] Under section (c) of 42

110. 10 C.F.R. § 100.11(a)(1) (1978). The exclusion area must be of such a size that an individual located at any point on its boundary would not receive, for two hours immediately following the onset of the fission product release, a total radiation dose to the whole body in excess of 25 rem. Note 2 explains that 25 rem is the amount NCRP recommendations allow for a harmless, accidental, or emergency exposure to radiation workers.

111. Price-Anderson Act, 42 U.S.C. § 2210 (1976).

112. *Id.* at (a). The Commission will determine the minimum amount of liability insurance needed by the applicant by taking into consideration: (1) the cost and terms of private insurance; (2) the type, size, and location of the proposed facility; and (3) the nature and purpose of the licensed activity. Currently, the applicant must acquire insurance coverage up to $60 million for any individual accident.

113. *Id.*

114. *Id.* at (b), (c).

U.S.C. 2210 (1976) the Government will indemnify, up to $500 million, those licensees whose license requires less than $560 million coverage.[115]

F. *Nuclear Waste and Safeguards*

Another precondition of licensing is that the builder or licensee must determine the maximum foreseeable accident, and prove that sufficient safety precautions have been taken to guard against it.[116] In spite of safeguards, there is always the possibility of a serious accident.[117] Waste disposal is one of the greatest safety hazards associated with a nuclear powered installation, since radioactive waste generated from the facility must be carefully handled and isolated for prolonged periods of time.[118] Unfortunately, isolation is an expensive and imperfect way to control waste.[119] Waste control must be well planned, for as the court iterated in the *Natural Resource Defense Council* case, "Once a series of reactors is operating, it is too late to consider whether the waste they generate should

115. One of the reasons the Government is still subsidizing the nuclear industry is that, currently, private insurance will only cover a little over $100 million worth of liability. Until private insurance is available to substantially protect the public, the Government will continue to subsidize those portions not covered. *See* 42 U.S.C. § 2210(b), (c) (1976).

116. D. INGLIS, NUCLEAR ENERGY—ITS PHYSICS AND ITS SOCIAL CHALLENGE 115 (1973). The NRC recently shut down a nuclear facility in Idaho in order to determine if the safety precautions taken would, in fact, function properly. Wall St. J., Dec. 12, 1978, at 1, col. 1.

117. A. LOVINS, *supra* note 2, at 104. This may be demonstrated by the Browns Ferry incident, in which a technician, while searching for air leaks with a candle, caused a 7 ¼-hour cable tray fire under the control room. The emergency core cooling systems (ECCS) failed to function properly, and the only thing that prevented a core melt was manual control of pumps and valves which were not intended as safety functions. Another example of potential hazards is illustrated by an incident which occurred in Idaho when three inexperienced army personnel tried to move a sticky control rod in an "abnormal" way by hand. The three men were instantly killed by a burst of radiation, and more than a week passed before shielded clean-up workers were able to enter the building to remove the bodies. *Id.* at 116.

118. *Id.* at 140-41. There is a general two-step method of dealing with spent fuel rods. The first step is to store them under water at the facility site until the short-lived components of radioactivity die off. Next, they are placed in special heavy caskets designed to absorb radiation and minimize the chances of leakage while being transported either to fuel reprocessing plants or to underground storage areas.

119. National Resources Defense Council, Inc. v. United States Nuclear Regulatory Comm'n, 547 F.2d 633, 641 (D.C. Cir. 1976). The decision to license nuclear reactors, which generate large amounts of toxic wastes and which require a special isolation from the public and the environment for several centuries, is "a paradigm of irreversible and irretrievable commitments of resources which must receive detailed analysis under § 102(2)(C)(v) of NEPA" as found in 42 U.S.C. § 4332(2)(c)(v).

have been produced."[120] This decision is particularly significant because it finds that the NEPA regulations require consideration of the environmental effects of nuclear waste during the initial stages of the licensing process. Additionally, the NRC must consider the environmental aspects of the reprocessing of nuclear waste before granting a construction permit.[121]

G. *U.S. Public Interaction in the Siting Process*

1. *Case History of the Seabrook, New Hampshire Site*

The Seabrook nuclear facility site was chosen from nineteen possible New Hampshire locations in mid-1973. From the outset, there has been opposition to the Seabrook facility, generated principally from the Clamshell Alliance and Friends of the Earth. The NRC waited two years for final approval of the Seabrook site as a result of the environmentalist opposition.

In response to recent attempts to change the site, the NRC has stated that, "the test to be employed in assessing whether or not a proposed site is to be rejected in favor of another site is whether an alternative site is obviously superior to the site already approved."[122] Thus, it is apparent that a change will be made only under unusual circumstances brought about by time, environmental oversights, or other factors which would make an alternative site superior.

In 1977, the Clamshell Alliance staged a successful demonstration against the Seabrook site. The demonstration was planned well in advance, and nonviolence was emphasized. Volunteers were trained in the methods of nonviolent resistance and were to instruct small groups at the demonstration.[123] The protest culminated with the peaceful occupation of the Seabrook site by over 1400 demonstrators. The resistance train-

120. 547 F.2d 633, 640 (D.C. Cir. 1976).

121. *Id.* at 641. Environmental groups find this case significant because, "absent effective generic proceedings to consider these issues, they must be dealt with in individual licensing proceedings." This will give the opponents of nuclear power at least one more chance to slow down, or temporarily stop, reactor construction.

122. [1977] 2 NUCLEAR REG. REP. (CCH) ¶ 30,216.8. At least two significant realities of the NEPA process support the use of the standard of obvious superiority: (1) the inherent imprecision of cost/benefit analysis; and (2) the probability that more adverse information has been developed respecting the closely examined site than any alternative site.

123. TIME, May 16, 1977, at 59. The reason for increased participation in mass protests was best summarized by a spokesmen for the Clamshell Alliance, "We feel Seabrook in particular and nuclear power plants in general are life and death issues, we are acting in self-defense."

ing was so successful that it took police several hours to remove the majority of the demonstrators.[124] Then in June 1978, after negotiations with state officials, the Seabrook demonstration site was transformed into an "energy fair" attended by 20,000 persons.[125] The Seabrook incidents have signaled a new phase of mass public protest against nuclear power.[126]

In 1976, public protest in the German town of Whyl forced authorities to close that site and halt all construction of the nuclear power plant.[127] One reason that these demonstrations have gained such magnitude and attendance is that people are becoming more frightened of nuclear facilities. Public fear slows down the construction and licensing of these facilities, thus increasing cost. In addition, every concession and every added safeguard become a minimum demand for future facilities. It is no wonder that concessions to public demands are made reluctantly.

2. *Facilities*

The NRC licensing board is aware that the public desires to participate in the siting process, but given the technicality of the issues and the delay caused by public intervention, the licensing commission would like to limit public involvement. Since the NRC is an administrative body, it is able to focus on future events and political consequences instead of being encumbered by precedent.[128] This makes intervention all the more appealing since an individual who successfully argues his position may halt an entire project. As stated previously, an individual may intervene if he can show a potential harm, has standing, or lives in the vicinity of the project. He must not

124. NEWSWEEK, May 23, 1977, at 25. The "en masse" protests may have very serious effects on nuclear facility siting. As a purely economic factor, the Seabrook seige is an excellent example. While the demonstrators, held in the New Hampshire National Guard armories, were awaiting trial, it cost the state more than $50,000 per day to care for them.

125. N.Y. Times, June 25, 1978, at A18, col. 1. *See also id.* June 26, 1978, at A14, col. 2.

126. NEWSWEEK, *supra* note 124, at 25.

127. *Id.*

128. The administrative process is not an entirely independent proceeding. Judicial adjudication reviewing administrative functions were divided into three basic groups in Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 (1971): (1) the court must first delineate the scope of the agency's authority, and then closely examine the facts to determine if the agency acted within its authority; (2) the decision made by the agency must not be arbitrary nor an abuse of discretion; and (3) the court must determine whether the agency adequately followed necessary procedural requirements.

only show how his interest will be affected, but must also specifically detail the problem he wishes to remedy.

An intervenor may petition for an amendment to any administrative regulation, for the passage of a new rule, or for the appeal of rules through the Administrative Procedure Act[129] or through 10 C.F.R. section 2.805(b) (1978). However, the petition must reflect "meaningful participation," not merely a delay tactic. This is ensured, in part, by the NRC requirement of proper standing.

There is ample justification for allowing public participation in the licensing process of nuclear facilities. Proponents of nuclear energy argue that intervention lengthens the construction time and thus increases the cost of facilities. On the other hand, opposition to nuclear energy is intense, and those who are denied an outlet for their objections will delay projects by various methods of demonstration, judicial intervention, and administrative slowdowns. In reality, significant participation by intervenors would ameliorate the entire process; issues would be identified more readily and accurately; and the power to influence an NRC decision would reduce unnecessary delay, thereby saving time and money.

H. *Public Interaction in Siting*

The use of nuclear power is an emotional, frequently debated issue. Violence and increased attendance at mass protests necessitate a constructive program of public participation. The program should serve a twofold purpose: (1) to permit the public to participate in and contribute to the licensing process; and (2) to disclose all information, and to identify and resolve major issues at the preconstruction stage of development.[130]

Notice of nuclear license and site hearings is available only to those who habitually read the Federal Register. This is an unrealistic and ineffective way to give notice: supplemental notices are necessary. As set forth in *International Harvester*

129. 5 U.S.C. § 553(e) (1976). *See also* Bain, *Informal Rulemaking: Quest of Nuclear Licensing Reform*, 55 DEN. L. J. 177 (1978).

130. The public is reluctant to accept the findings of the NRC or the public utility operators of nuclear facilities on the safeworthiness of an installation. The NRC, public utilities, and intervenors must make full disclosures in the initial proceedings if the system is to improve.

Co. v. Ruckleshaus,[131] adequate notice requires that the public be informed of the proposed regulations. In addition, all issues must be delineated, and descriptions of critical experiments must be included in the notice.

The public must be given complete, timely, and prominent notice. Since states have become more involved in nuclear siting and regulation, they should shoulder the responsibility of insuring adequate public notice concerning facilities within their own jurisdiction. Local newspapers and the electronic media could be used effectively to advertise the hearings.

III. CONCLUSIONS

The nuclear power question cannot be left to the exclusive control of governments. Groups and individuals in many countries have demonstrated a genuine concern for their safety, as well as a desire to effectively participate in the licensing process. Public concern is evidenced in the legislative and electoral processes of most nuclear powers.[132]

Nuclear energy is a controversial issue which will receive even more attention in the future. It is thus important that at least two objectives be met in the near future: (1) the public must be allowed to participate more effectively in the licensing process; and (2) alternative sources of energy must be developed.

Public participation in France and the United States has increased. Unfortunately, there are many problems yet to be resolved. For instance, the United States could follow France's example by expanding and diversifying public hearing notices, and France could allow more direct public participation in the licensing process. In both the United States and France, public relations need improvement. Since the public is skeptical of nuclear energy, proponents should take the offensive rather than the defensive: the public needs to be informed of the safety features and successes of existing nuclear programs. In-

131. International Harvester Co. v. Ruckelshaus, 478 F.2d 615 (D.C. Cir. 1973).

132. Sweet, *supra* note 64, at 41. The anti-nuclear sentiment was so strong in Sweden that it culminated in victory for those politicians who espoused anti-nuclear views.

In Austria, the anti-nuclear movement has been so successful that the 700mw Zwentendorf nuclear facility, which was completed at a cost of $650 million, and which is now standing idle, was rejected by Austrian voters in a national referendum. Rocky Mountain News, Nov. 6, 1978, at 3, col. 2.

formation must be more widely disseminated and must be more readily available to the public in a form that is neither too technical nor too simplistic.

France, the United States, and the world need more than energy conservation and an alternative energy program in the near future: that conclusion is inescapable. A complete withdrawal from nuclear energy, even if commercially viable, would be impractical and unrealistic. We must therefore use the resources available to us, and make the best of a difficult situation.